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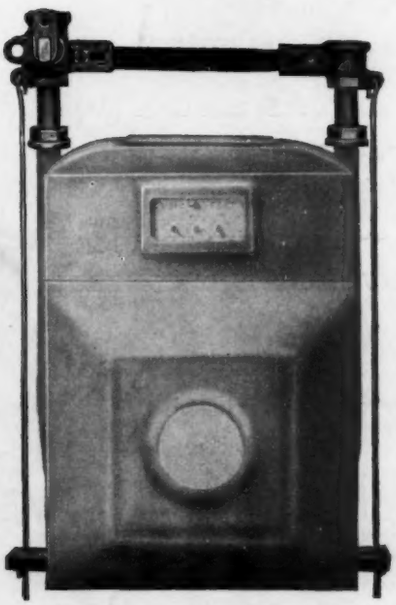
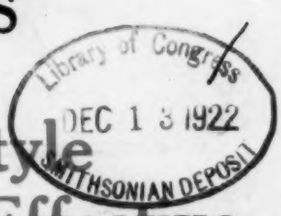
LATTIMER-STEVENS
METER CONNECTIONS



No. 45 Connection with Shelf
(Red brass lock wing cock built into inlet end)

No. 40 Connection Apart



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The accompanying illustrations indicate the simplicity of the No. 40 and No. 45 connections. The inlet end of the No. 40 connection is made with a male thread to connect directly with stopcock. The inlet end of the No. 45 connection takes the place of a stopcock. The outlet end of both styles takes the place of a union or other fitting.

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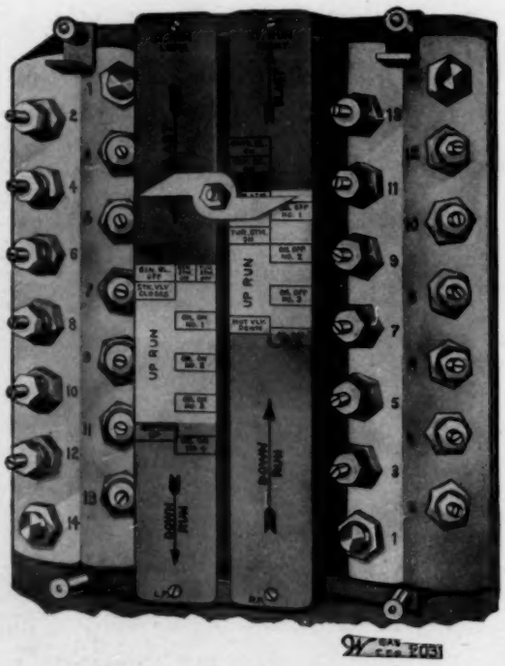
INDEX TO CONTENTS, PAGE 4

ADVERTISERS' INDEX, PAGE 33



Close-up of the Indicator
(The Cover plates over Timing Screws were removed for this picture.)

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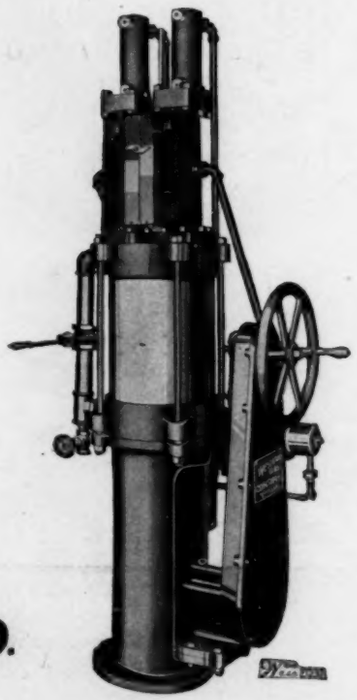

The Western Gas Construction Co.
Fort Wayne, Indiana

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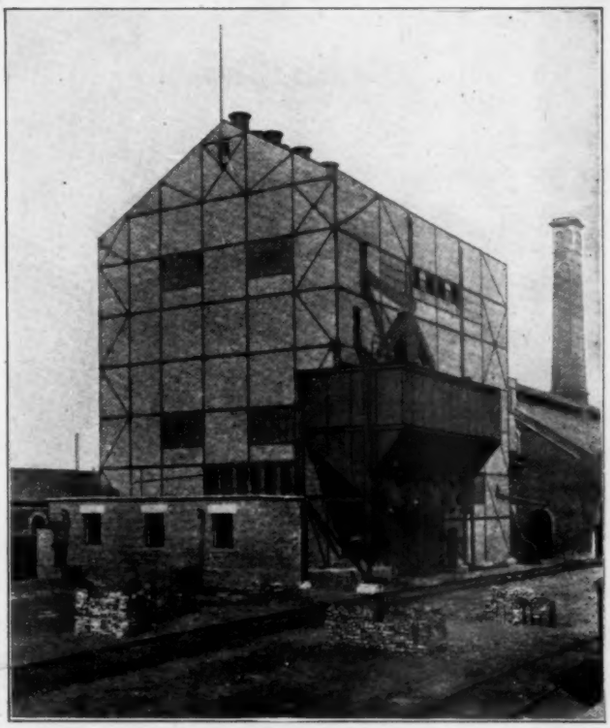
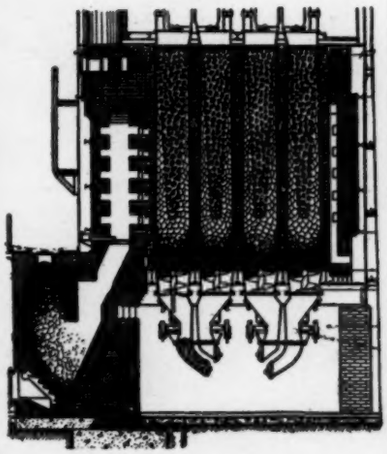


INSTALLATION AT COATBRIDGE, SCOTLAND.



From our present stage of actual experience in the working of large and small installations of Glover-West system of continuous vertical retorts, with a great variety of coals in all parts of the world, it is difficult to realize the diffidence with which the idea was received when first put forward as a practical proposition. Now that it is established that the continuous vertical retort system can be designed and worked to deal with any class of coal, and to yield in gaseous form a considerably greater percentage of the heat value of the coal than the older systems—and percentages varying not only according to the quality of the coal, but according to the discrimination of the engineer—continuous carbonization makes an irresistible appeal.

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American Gas Journal

SIXTY-THIRD YEAR

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Contents of This Issue

British Practice in Handling Coal by Suction—By C. H. S. Tupholme 645

Comparison of American and European Methods of Coking..... 649

Distillation Gases Yielded by Trent Amalgams—By J. D. Davis 653

As The Journal Views It..... 655

Haynes on Municipal Ownership
New York City and the Coal Shortage
President Brown Optimistic

Why Municipal Ownership Has Proven a Failure—By Paul P. Haynes 657

Public Utilities Securities Market Report..... 661

News of the Gas Industry..... 662

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British Practice in Handling Coal by Suction

Gas Companies Find Many Uses for Plan

By C. H. S. TUPHOLME, London, England

The suction method of handling is finding ever-increasing favor in Britain and has already been applied not only to grain, but to coal in a large number of industrial plants. As far as gasworks are concerned, the method has been adopted in some cases, and the extension of its use depends mainly on the realization of its economical features by gasworks engineers.

A general description of the main features of these pneumatic plants may be of interest as typifying modern British practice.

Every suction conveying plant, no matter how it may be elaborated to suit the conditions, comprises the following elements:

(1) The conveying pipes through which the material (coal, grain, etc.) is conveyed by a current of air.
(2) The vacuum pumps and their prime-mover to produce the aforesaid current of air.
(3) The receiver or expansion chamber in which the material is deposited in consequence of the diminution of the speed of the current.
(4) The discharging mechanism for extracting the material from the expansion chamber without loss of air.
(5) The dust separator, for cleaning the air before returning it to the atmosphere.

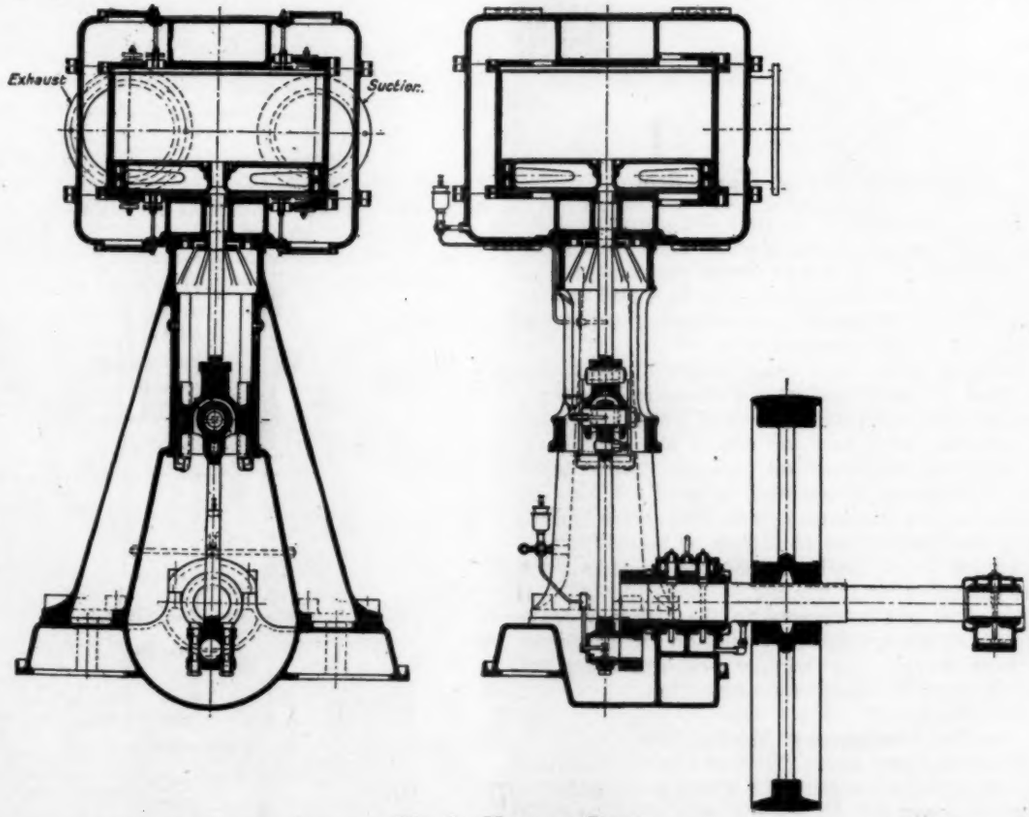


Fig. 1—Vacuum Pump

(6) Air-piping connecting the receiver to the dust separator and the dust separator to the vacuum pump.

The conveying pipes terminate in flexible portions, and are fitted with suitable suction nozzles, having adjustable by-passes to prevent chokes. When these nozzles are plunged into the coal, it is at once sucked into the pipe, or rather carried into it by the air current drawn through the mass of coal, and is delivered by the discharging mechanism which, with the receiver, is placed at the point where the coal is required. The vacuum pump and the dust separator may be placed wherever convenient, and not necessarily immediately adjacent to the receiver. The receiver and the dust separator are quite commonly combined in one steel casing.

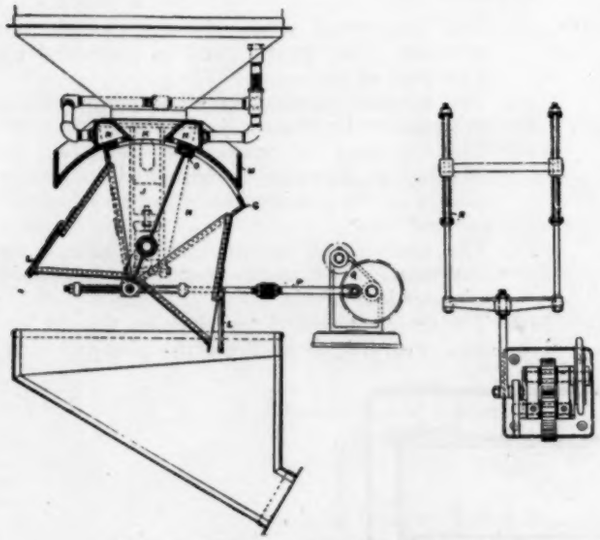


Fig. 2—Discharging Tipper Seal

It is important to observe that the pumping unit of a coal-handling plant can also be used to convey ashes from the boiler house to the ash tank or dump, and further, to remove deposits from flues and economizer chambers. Separate plants can also be installed for the latter purposes only.

The vacuum pump has been designed especially for this class of work, and is of the vertical pattern, with valves situated in the top and bottom covers. The valves are composed of single steel discs of special material mounted on spindles with light springs. The pump is designed to give a high efficiency with a low vacuum or small pressure difference of some 7 inches to 12 inches of mercury, and is constructed so as to be unaffected by any dust which is carried over in the air.

The piston is not lubricated in the ordinary way, but to prevent any unnecessary friction the cast-iron piston rings carry a special dry graphite composition, which requires little or no attention.

The Discharging Mechanism

The following is a description of the discharging mechanism or tipper seal. The rocking member G contains two pockets, H, J, which are alternately brought into communication with the outlet, K, of the receiver. While each pocket is thus engaged, and therefore under vacuum, its hinged discharge door, L, is held closed by the pressure of the atmosphere. Simultaneously the other pocket has been swung far enough to admit air through the feed opening and has permitted the hinged door to open and discharge its contents. The frame of the tipping box, including the circular rubbing face, is of cast iron, and is pivoted in adjustable bearings, the bearings being supported by brackets carried from the upper or seat casting, M, in which ports, N, are arranged for exhausting the air from the pockets before coal is admitted to them. The object of the latter arrangement is to prevent the inrush of air carrying the coal over and into the dust collector. The air-tight joint between the tipping box and the upper casting is made by two means. There is a steel packing strip, O, held in the cross-bar between the two pockets against the face of the upper casting by bow springs, and at the sides and ends of the rubbing face of the tumbling box leather strips are provided. The hinged discharge doors are also rubber faced to make an air-tight joint.

The tumbling box is made to oscillate through the desired angle by the mechanism shown, comprising a crank and connecting rod, P, operated by a train of spare gear wheels, Q. Interposed between the connecting rod and the tippers are helical springs, R, the object of which is to prevent damage to the apparatus in case of any solid body, a piece of iron for example or large lump of coal, becoming jammed between the cross-bar of the tipping box and the lip of the seating—an advantage not possessed by the ordinary rotary seal. It should be mentioned that the crank mechanism is adjustable to allow for the normal compression of the springs.

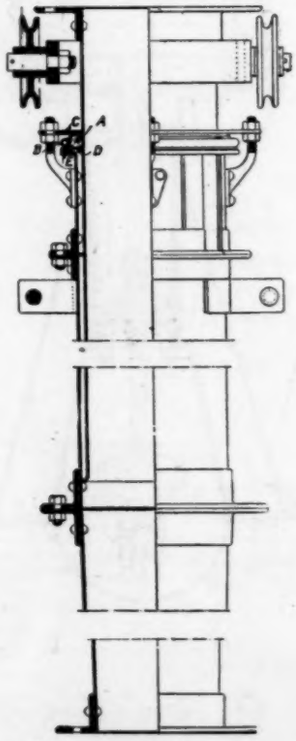


Fig. 3—Telescopic Pipe

Another interesting feature of the design is the telescopic pipe (see Fig. 3). This enables the height of the nozzle to be varied to the extent of 10 to 15 feet, according to the level of the material in the barge. The upper pipe slides into the lower one, thus preventing the material falling between the joint and causing jamming. The packing joint comprises a ring of soft self-lubricating packing, A, held in place by means of a spring, B, and a bolted flange, C. The packing rests upon a loose ring, D, between which and the flanged end of the lower pipe is a rubber ring, E. The whole of the packing can be readily taken to pieces by removing the nuts shown. The lower end of the pipe is raised or lowered by means of wire ropes carried over guide pulleys.

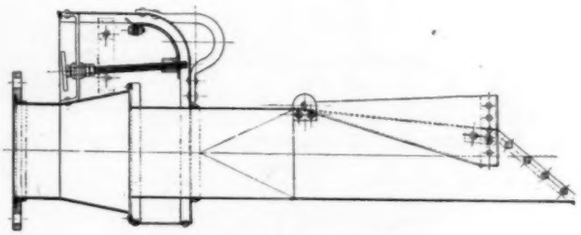


Fig. 4—Suction Nozzle

A typical form of suction nozzle is shown in Fig. 4. It is built up of wrought-iron plates, acetylene welded and riveted, and consists of three parts, two of which form the duct by which the coal enters, and between these there is the annular air chamber through which surplus air is admitted.

The amount of air admitted in excess of that which flows in with the coal depends upon the material which is being lifted and other conditions, such as the position in which the nozzle is working. It is regulated by means of a hand screw which moves a valve in the body of the nozzle. One side of the inlet duct is hinged and secured by a pin, so that in case of a stray lump of coal jamming in the nozzle the pin can be withdrawn and the obstructions released.

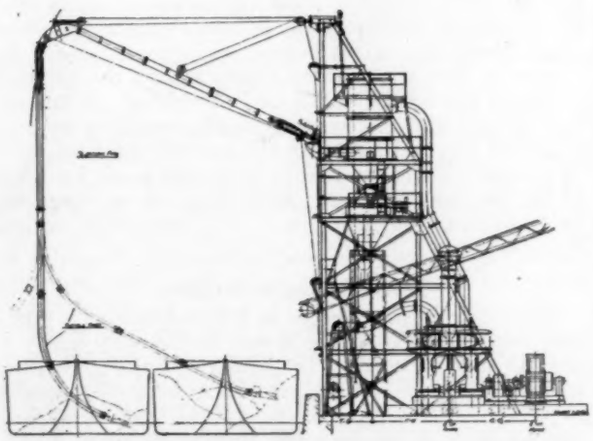


Fig. 5—Cross Section of Pneumatic Coal Discharging Plant. Capacity 120 Tons Per Hour

Description of Plant in Operation

A typical pneumatic coal-handling plant was installed at the Bankside Electricity Works for the City of London Electric Power and Lighting Co., Ltd. (see Fig. 5). There are two braced steel towers, each containing a receiver and tipper seal, and each unit is capable of handling 60 tons of coal per hour. A pipe boom is connected to each receiver by means of a swivel joint, which provides for the lateral movement of the boom. A length of flexible piping, with telescopic sections and suction nozzle, is coupled up to the end of each boom, and hand winches are fitted for controlling the luffing and telescopic movements of the pipes. The booms are of such length and the receiver towers are so placed that the pipes can command eight Thames lighters lying at two berths four abreast. This is an excellent example of the flexibility of the pneumatic system. The tipper seals deliver the coal on to band conveyors, which transport the fuel to the bunkers, and this plan of employing the pneumatic plant for the difficult part of the work, and ordinary band conveyors for transferrig the material from point to point, is one to be recommended where its adoption is practicable. The pneumatic installation is operated by a twin-cylinder pump, driven by an electric motor of 240 H. P., each cylinder being connected to its respective receiver, so that it is possible for one unit to be discharging coal while the other is not in use.

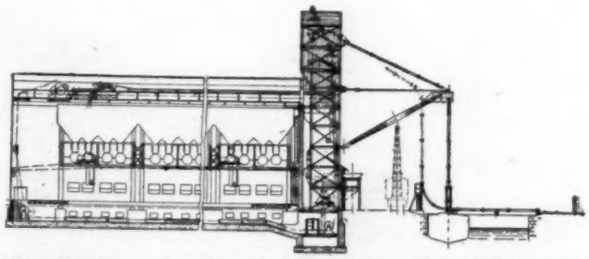


Fig. 6—Cross Section of Pneumatic Coal Intake and Conveying Plant. Capacity 50 Tons Per Hour

Fig. 6 shows a pneumatic coal-handling plant installed at the Brimsdown Power Station for the North Metropolitan Electric Power Supply Company. A tower has been erected at the end of the bunkers for housing the receiver and tipper, seal, a separate air filter, and an Avery automatic weighing machine. The coal is released from the pneumatic plant by means of the mechanically operated tipper seal, which discharges the fuel into the autoweigher. This machine in turn delivers on to a band conveyor fitted with a traveling throw-off carriage, which distributed the coal to the various bunkers. Two conveying pipes lead into the receiver; the boom of one of these pipes is supported by a swinging steel jib, as shown in Fig. 6, and the pipe branches into two detachable and flexible intake sections provided with suction nozzles for discharging coal from barges at the rate of 50 tons per hour.

The steel jib is arranged to swing clear of the locomotive crane running on the wharf, and this lateral movement permits the pipe to be brought into position for coupling to the terminal of a fixed pipe which extends the length of a reserve dump.

The fixed pipe is provided at convenient intervals with connecting points, to which can be attached flexible suction pipes and nozzles for taking coal from the dump. By means of this arrangement, the same conveying pipe is used for discharging barges and for withdrawing coal from the reserve dump.

The other conveying pipe transports coal to the receiver from the tippler hopper on a railway siding nearly 200 feet away, and this pipe is arranged to run over the roof of the office buildings and along the face of the boiler house in a manner which would be obviously impractical with any other system of conveying. It is not possible in this case for both pipes to be in operation at once, as this arrangement is not required.

In discharging from ships into railway wagons the scheme is on a scale comparable with grain-handling work, involving four discharging units of 160 tons per hour capacity each. Each unit comprises receiver and dust separators, tipper seal, automatic weighing machine of 2½ tons capacity, electrically-operated suction pipes all mounted on a steel structure, running on an existing pier. Air suction mains run along the pier to a pumping station at one end, and are provided with branches at intervals for connecting up to the traveling discharging units.

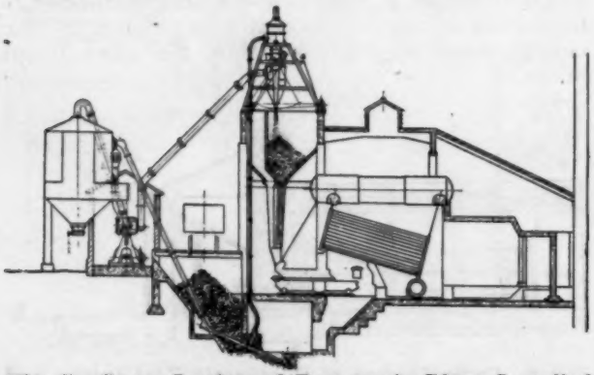


Fig. 7—Cross Section of Pneumatic Plant Installed for Conveying Coal to Overhead Bunkers and Removing Ash from Under Boilers to Ash Tank

Naturally a floating plant for coaling ships can only be used if the coal to be handled is limited in size by specification to, say, two-inch cube, though occasional larger lumps in the mass of small material can be effectively handled. Among the advantages of the pneumatic system for this and other purposes is the fact that there is no spilling and no dust.

Fig. 7 shows a pneumatic plant installed for Messrs. Rowntree & Co., Ltd., York, for taking coal from pits under bottom-door discharging wagons and delivering it to overhead bunkers, and also for removing ashes from boiler pits. There are two receivers and tipper seals mounted over the bunkers, and conveying pipes run from the coal dumping pits to these receivers. There is a concrete ash tank close to the pump house, capable of holding about 40 tons of ashes, which are drawn by suction from a series of small hoppers arranged in front of the boiler ash-pits. The ashes are quenched on entering the concrete tank, and are discharged through the hopper bottom into carts as desired. The plant is designed to handle 120 tons of coal and the resulting ash in eight hours.

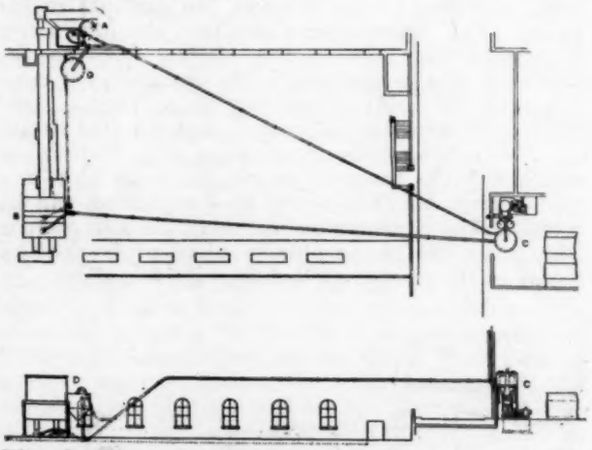


Fig. 8—Plant fo. Transporting Breeze at a Gas Works

Transporting Coke Breeze

In Fig. 8 is shown a plant for the transport of coke breeze at a gas works. Here the adaptability of the pneumatic system to meet difficult conveying conditions is well illustrated. Breeze is to be conveyed from the points A and B, and delivered to the boiler house at C or delivery bunker at D. It is impracticable to run a conveyor across the coke yard, but pipes can easily be arranged along the lines indicated.

Among industrial materials for the handling of which the pneumatic system is particularly suitable is the oxide used for gas purifiers. In most gas works at the present time the oxide is in a very hard and caked condition when it is removed from the purifier boxes, as the tendency is to leave it in the boxes for as long as possible in order to minimize the cost of removing and replacing.

The handling expenses, however, can be greatly reduced by the use of the pneumatic system, and it is likely that in future gas engineers may follow the example of the Huddersfield Corporation, which has installed a pneumatic plant for the removal of oxide direct from the purifier boxes.

In this case the purifier boxes are on the ground level and the revivifying floor is overhead. A traveling receiver and discharging seal is arranged so that it can be wheeled about on the revivifying floor, and connected at various points to an air main running along the length of the floor, thus permitting the oxide drawn from the boxes to be deposited where it is required.

Use a Portable Hopper

The oxide is shoveled from the boxes into a portable hopper, which is connected to the receiver by a flexible suction pipe. The hopper is covered with a strong grid, on which large lumps can be easily broken by a blow from the spade until they are small enough to pass through the pneumatic pipe, which is 4 inches in diameter.

The plant is also adaptable for picking up the

revivified oxide and returning it to the boxes. A portion of the oxide is sometimes revivified on the ground alongside the purifier house.

The pneumatic oxide handling plant shown in Fig. 9 was installed for the Gas Light & Coke Company at their famous Beckton Works. In this case the oxide is too hard when it is removed from the purifier boxes to be dealt with direct by the pneumatic plant. The oxide is, therefore, transported in trolleys and tipped into a hopper in the ground, which feeds a disintegrator. This machine discharges the granulated material through a rotary seal into the pneumatic conveying pipe. In this instance, the oxide is not conveyed by suction, but by a stream of air under pressure, and instead of the material being drawn into the receiver, it is blown out on to the revivifying floor overhead.

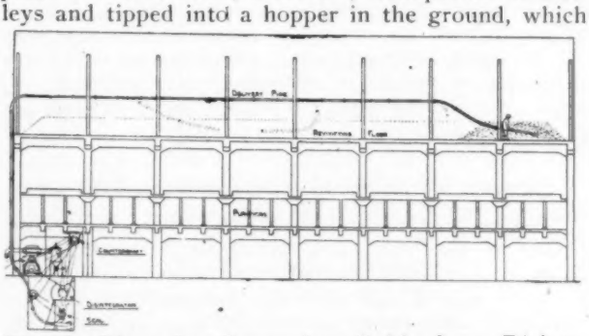


Fig. 9—Plant for Conveying Oxide from Disintegrator to Revivifying Floor

As will be seen from the diagram, the rotary seal and disintegrator are placed underground for convenience, and all the machinery is belt-driven from a countershaft, which in turn is driven by a 65 H. P. electric motor. The disintegrator absorbs 35 H. P., and the balance of power is required to operate the pneumatic plant, which has a capacity of 20 tons per hour. The oxide is lifted 55 feet to the revivifying floor, and is blown horizontally through either of two pipes arranged in parallel and extending overhead for a distance of 150 feet. The two pipes can be used alternately, and each is provided with three connecting points, to which can be coupled a length of flexible piping, through which the oxide is blown on to the revivifying floor. This arrangement permits an even distribution of the oxide over the whole area of the revivifying floor.

Comparison of American and European Methods of Coking

Reasons for Superiority of Our Practice

Joseph Becker, Consulting Engineer, The Koppers Company, Pittsburgh, Pa., in a paper presented before the Eastern States Blast Furnace and Coke Oven Association, at Buffalo, N. Y., gives the following information on coke oven practice in this country and abroad. Mr. Becker's paper is of interest to gas men, and in part is as follows:

"Before entering into the subject of this paper, perhaps it would be well to mention briefly the remarkable development which has taken place in the by-product coke industry in the United States in the past decade, particularly in its relation to the iron and steel industry with which it is so closely identified.

"Not quite 15 years have elapsed since the United States Steel Corporation installed its first by-product coke plant of Koppers design, at Joliet, Ill., and since blast furnace operators were looking with doubt and suspicion on the by-product coke oven as a source of blast furnace fuel; but in this comparatively short time the by-product coke oven has come to be an essential part of an economically operated iron and steel plant. It is not necessary for us to go into the causes leading up to this development—they are too well known to require even mentioning—but it is only fair to say that this result was only possible through the close co-operation which blast furnace operators have extended to those of us who had to do with the operation, construction and design of by-product coke ovens.

American By-Product Coke Oven Practice Superior

"It is no idle boast to say that American By-Product Coke Oven practice leads the world today—this despite the fact that the by-product coke oven originated and was in general use on the continent before it was even thought of in the United States. The writer had an opportunity last year to visit Europe and to study European by-product coke oven operation very carefully and what he saw convinced him that from the standpoints of quantity production per oven per day and quality of product, European practice is many years behind us. That very little, if any, progress has been made there in the past 10 or 15 years is brought out very clearly in an article in the September 2nd issue of *The Gas World* of London, describing an installation of 100 ovens for the purpose of carbonizing 540 tons of coal per day. This article goes on to say that the plant previously consisted of 100 horizontal flued waste heat ovens which have been in operation for 15 years. These ovens have a capacity of 7 tons and the 100 ovens carbonizing 500 tons of dry slack coal per 24 hours. This would be equivalent to 31 hours' coking time. The additional 100 ovens recently completed are of the vertical flued type, and have a capacity of 7½ tons each with a carbonizing capacity of 540 tons of dry slack per day. This would be equivalent to a coking time of about 33 hours. This very strikingly shows

that at least on this plant no progress has been made with respect to increasing the coking capacity per oven.

"It is remarkable that after 15 years a new plant is built which has even less carbonizing capacity per oven per day than the old plant, in spite of the enormous progress that has been made in United States during the same period in the way of increasing oven capacity. This is merely citing one instance of English coking practice and the majority of English coke plants operate under very similar conditions. One wonders why conditions are not changed in England, in view of the large number of visitors who come to the United States every year to investigate our by-product coke plants.

"The writer has observed similar things during his last year's visit in Germany. There have recently been put into operation ovens of the Koppers type, which are heated with blast furnace gas and which are supposed to operate on 18 hours' coking time. These have an average width of about 16 inches and a length of about 32 feet between doors, making a carbonizing capacity of about 14½ tons per oven per day. This is very likely the largest capacity of any type oven of similar dimensions in Europe. However, even this capacity is low when compared with American coke oven capacities. Modern American ovens carbonize more than double the quantity of coal per day that can be coked in ovens as built in Germany and England. An America company has recently contracted to build a plant to carbonize 1,000 tons of coal per 24 hours in 37 ovens. The ovens are designed to carbonize 30 net tons of coal per oven per day, and are of a type to be described later in this paper.

"The question now arises, What is the reason for this great difference in coking speeds? Many have been advanced by our European contemporaries, the most prevalent of which is that they have to carbonize wet washed coals and that this makes it impossible for them to attain the same coking speeds possible here. This does not sound quite reasonable and furthermore it is a fact that several plants in this country are using washed coals averaging 12 per cent moisture and more, and carbonizing them in from 15 to 17 hours in Koppers ovens averaging 17 inches in width.

"Another reason given is that the character of their coals is quite different from those found here. The writer has made an examination of the analysis and coking qualities of the various coals found there, and in general they correspond very closely to the coals found in this country—so this argument does not seem to hold.

"Most striking proof of the fallacy of both these arguments was given during our recent coal strike, where several companies operating by-product coke plants imported large quantities of English coals to avoid curtailing operations. The Seaboard By-Product Coke Company at Jersey City, N. J., received over 100,000 tons of English coals such as Yorkshire and Durham coals, and coked them in 16 hours continuously with the same ease as American coals of different varieties used there, producing coke of very good quality for metallurgical purposes. About 100 tons of Yorkshire and Durham coals were sent to the Chicago By-Product Coke Company's Coke plant and separate coking tests were made in the new five-oven battery. These coals were perfectly coked at a coking time of 11 hours, without the slightest difficulty, and the coke produced was just as good for blast furnace use as any coke made in the Pittsburgh District from Pittsburgh coals. The capacity of this oven on these coals is, therefore, 25 net tons per oven per day.

"Unquestionably one reason for their not being able to attain our coking speed is the fact that they do not generally use silica construction. On the other hand, there are ovens of this material over there; but these have not attained anything approaching American practice.

Reasons for Superiority of American Practice

"In the writer's judgment, the difference in capacity of the American ovens as compared with those in Europe is due entirely to the proper use of properly manufactured silica material throughout, combined with better design, and last, but not least, better operating organizations and more systematic operation.

"The organizations operating the coke ovens in America consist generally of technically trained men with good practical experience, the latter not being generally the case in Europe. American operators have more tenacity in solving problems and difficulties in organization and operation in order to attain greater capacities from their plants and do not offer excuses for inability to maintain a high output as is done abroad.

"One of the most important features of organization to be found in American coke plants is the strikingly systematic operation of the ovens. Ovens are heated by intelligent heaters and most of the assistants and superintendents of American plants have passed through the entire school of by-product coke oven operation, beginning as heaters. Even in cases where this is not so, the assistants and superintendents fully realize the importace of oven heating and consider the oven operation the 'heart' of the entire by-product coke plant.

"In European operation, on the other hand, insufficient talent and talent of a lower quality are employed to take care of the ovens. The result is that the coke oven batteries need frequent repairs and relining, often after only three to five years of operation. In making this statement, I do not refer to plants using highly expanding coals or coals containing excessive amounts of sodium chloride which are coked in clay ovens instead of in silicia ovens. The usual class of heaters employed in Europe are men who are not acquainted with combustion problems and who operate the ovens by rule of thumb methods. In most plants, it will be found that there is no pushing schedule at all. Ovens are picked out and pushed as they become ready, so that it can be stated as a general rule, the ovens on the Continent operate the heaters, while in America the heaters operate the ovens. Taking all these things together, the result is that America can make the same quantity of coke from the same coals in less than one-half the number of ovens.

"Another excuse usually offered is that with our fast operation we destroy by-products. The writer had an opportunity to investigate this and finds that the by-product yields here are fully equal to those obtained in Europe.

"As is usual in American industrial practices, the natural tendency in the building of coke ovens has been to attain a maximum capacity per unit oven while simultaneously producing a good quality of coke. Therefore, the development in America has been a gradual increase in the size of the ovens. The use of high-grade silica throughout the structure has reduced the time required for coking very considerably as compared with the use of clay bricks. But beyond the increase of capacity an improvement of the design of the ovens proper was necessary that long and high ovens could be built with proper heat distribution over the considerably increased coking areas.

The Problem of Design

"The problem of designing ovens which would assure a perfect distribution of heat over such large areas was a difficult one. A great number of coke plants were desirous of coking 100 per cent high volatile coals. The blast furnace practice showed that coke made from such coals should be pushed at relatively lower temperatures. When pushing coke made at low temperatures, any uneven heating conditions in the ovens becomes much more pronounced and visible than when pushing hot coke. Furthermore, it is a matter of course that the heating system of ovens of large capacities has to allow passage of larger volumes of gas, such as waste products of combustion through their flues. This calls for proportionately larger areas to convey such gases, in order to prevent great pressure drops throughout the heating system, which would seriously interfere with the proper operation of the ovens.

Uniform Heat Distribution Important

"Blast furnace and producer gas are most excellent fuels for heating the ovens, because such gases have a slower combustion speed and distribute the heats very uniformly.

Principles of Design

"It is the belief of the majority of coke oven and blast furnace operators that, especially from high volatile coals, better coke can be made in narrower ovens. In making the oven narrower, the coking capacity per 24 hours would necessarily be reduced unless a considerable multiplication of the operations would be resorted to. The first thought would naturally be to compensate for this by building higher and longer ovens and thus increasing the tonnage per oven per 24 hours. This would mean that the horizontal flue, with the type of oven as mentioned before, would have to be enlarged and thus occupy a larger space in the coking region, thereby retarding the coking of a proportionately larger amount of coal in that region. Furthermore, when equipping ovens so that they can be heated in the future with producer or blast furnace gas, which is unquestionably the proper construction, this flue must be enlarged again in order to make it carry the additional amount of inerts present in such B. T. U. gases. It, therefore, was apparent that the oven as it stood should not be increased in capacity without making changes in the design eliminating the effect of the horizontal flue on the heating conditions and thus eliminating its effect on the quality of coke produced. Also with increased capacities a relatively smaller horizontal flue would require an exaggerated closing of the discharge openings of the vertical flues to such an extent that the drop of pressure through the reduced openings would become too high for the best draft conditions throughout the oven structure. It is, of course, fully recognized that an oven can only be successful in operation, production and length of life provided the draft in the heating flue system be kept at the very minimum.

"It might be thought best by some to design ovens without any horizontal flues. Such ovens without horizontal flues usually operate in such a manner that adjacent vertical flues serve alternately as up-burning flame flues and down-going waste gas flues and vice-versa. It is evident, however, that an oven in which all adjacent heating flues or at least a great group of them serve at the same time in their entirety as down-going waste heat flues, is not subject to the danger of different draft conditions between adjoining flues. In this case, the up-burning flame flues can under no condition be affected by adjoining down-flow flues in case there should be any leakage in the brickwork separating such flues, a condition which can easily occur, especially as the ovens become older. Furthermore, the arrangement of the gas supply flues in an oven in which the gas is burned up in flue and down the next adjoining one is usually such that this gas supply flue is paralleled by an up-going regenerator on the one side and a down-going regenerator on the other side. This arrangement greatly increases the difficulty of keeping the gas supply flues tight. Also all ovens should be built so that producer gas or blast furnace gas could be used advantageously in the future, and in up and down-flow flued ovens, there will always be a counter current between waste gas and gas in regenerators, as well as between adjacent flues. All these dangers of leakage between adjoining flues are non-existing in ovens with paralleled flow, and it is, therefore, clear that it is best to retain a horizontal flue, because it insures simplicity in design and the greatest safety in operation of the ovens. Furthermore, it makes the system readily adaptable for the use of blast furnace and producer gas, without the objectionable counter currents.

Experimental Ovens Tested in Chicago

"These leading principles in oven construction have been tried out in a battery of 5 ovens at the plant of the Chicago By-Product Coke Company, at Chicago. The five ovens were put into operation on February 1, 1922, and have since that time operated continuously on a great variety of coals at coking times between 10 and 12 hours. *The new oven* has a length of 37 feet between doors, a height of chamber of 11 feet 8 inches and an average width of 14 inches, the taper between coke side and pusher side being 1½ inches. Cast iron jambs are used at the ends of the ovens. The vertical cut through the oven

lengthwise the battery shows the heating walls, coking chambers, arrangement of regenerators and the crossover flue communicating with the heating walls on both sides of the oven chamber.

"This shows that in this new design one side of the coke oven is heated in its entirety, that is, gas burns simultaneously on the coke side and on the pusher side, the products of combustion then join in the respective horizontal flues, pass through the crossover flues, one of which is located on the coke side and the other on the pusher side. Thence the products of combustion enter the respective horizontal flues of the adjacent heating wall and pass downwards throughout the entire wall into the respective regenerators. It is evident that the cross sectional area of a horizontal flue when operating in such a way can be considerably reduced as compared with the horizontal flue in ovens of the former design. This allows us to locate the horizontal flue higher than was previously possible and it furthermore allows the use of heavy walls between the horizontal flue and the coal chamber. This gives sufficient space to use insulating material if necessary in order to prevent any overheating of the gas space in the oven chamber. The insulation of the crossover flues at Chicago has been found to be entirely satisfactory and effective.

Increased Height of Flame Flue Heating

"One of the most important achievements claimed for this new design is the fact that the height of the flame flues has been considerably increased and these now extend as far up towards the top of the coal charge as is necessary for uniform heating of the entire charge. Thus the interference of the horizontal flue with the flame flue heating has been entirely eliminated. Of course, the number of crossover flues could be increased beyond two, preferably to five, the crossovers passing through the available spaces between charging holes. The size of the horizontal flue would thus, of course, be still more reduced, without causing an additional pressure drop. For ovens of 12 feet in height and of a length similar to the Chicago oven, it has been demonstrated at Chicago that only two crossovers are required to permit a size of horizontal flue that does not interfere with flame flue combustion and a flue which is consistent with good strong wall construction. However, there is very little reason why ovens should not be increased further in height and length, and it might then be preferable in order not to increase the size of the horizontal flue to build three or five crossovers.

"It is clearly shown that with this new design the size of an oven has become independent of areas required for the former horizontal flue which interfered with the perfect operation of the ovens, especially when they were of great capacity, since it is important to retain the advantageous functions of horizontal flues.

"It should be emphasized that on account of the fact that an entire side of a coke oven chamber serves either for up-flow combustion or down-flow products of combustion, any leakage between individual flues become of little consequence because all the gases flow either up or down and each flue is operating under the same pressure conditions. Since there is absolutely no counter flow in any of the heating flues, it undoubtedly constitutes the safest construction for flame heated coke ovens. It will also be noticed that the regenerators reverse longitudinally with the battery instead of crosswise, as in the former design. The usual longitudinal taper of a coke oven requires that larger amounts of fuel gas are used on the coke side as compared with the pusher side. In the type of oven formerly built, products of combustion from the coke side of the oven chamber exchange their heat with the air or air and gas going up to the narrow pusher side. Since for the latter side gases are required in smaller volume, the efficiency of the heat exchange varies with reversals as is shown by fluctuations in the stack flue temperature. In this new construction the in-going gases for each half of the oven are regenerated with the products of combustion from that half, and it is thus possible to maintain a lower uniform stack temperature which is the nearest practicable approach to the theoretical.

Minimum Leakage—No Counterflow

"It will also be noticed when air flows upward in two regenerators that the gas supply flue located in the supporting wall separating these two regenerators is operating also for up-flow combustion while the adjoining heating wall operates for discharge of waste gases and consequently the gas supply flue located in that particular regenerator wall is not in operation. In other words, there are hardly any pressure difference between up-flowing regenerators and gas supply flues and consequently the leakage of the gas distributing flue will be reduced to a minimum.

"When producer gas or blast furnace gas of low heating value is used for heating the ovens, it must be preheated in order to obtain the desired temperature and to operate economically. This preheating is accomplished by passing the gas through separate regenerating chambers on its way to the heating walls. In the new design of oven the arrangement of regenerators and flow of gases is such that there does not exist at any time a counter flow between in-coming fuel and out-going products of combustion in adjacent regenerator chambers. Fuel gas and out-going products of combustion are always separated by a regenerator containing in-going air. Should there be a slight leakage into the waste gas regenerator chambers, it would only result in loss of air, while it would be impossible to lose producer or blast furnace gas.

"The battery of 5 ovens of this new design at Chicago was operated on 11 hours coking time for several months with producer gas having a heating value purposely varied between from 85 to 125 B.t.u. and it was demonstrated that the oven when heated with this producer gas gave most satisfactory results as to heat distribution and fuel consumption. It was absolutely evident that there was no leakage of producer gas into waste gas on account of producer gas and air flowing in parallel and a counterflow only existing between air and waste gas.

"It has been demonstrated that on the 5 ovens at Chicago the arrangement of regulable ports in that construction is correct for both conditions, that is, when using straight coke oven gas or producer gas. The same small temperature difference between top and bottom when using coke oven gas was observed as when using producer gas.

Coke of Uniform Quality and Size

"The coke produced from these new type ovens was decidedly more uniform than that produced from the older ovens. The large pieces of coke originating near the horizontal flue region of the older oven were entirely absent in the coke from the new oven and the coke from the bottom part of the new oven was just as large as the coke from any other part of the oven.

Shatter tests and combustion tests have been made from coke out of different elevations of the new ovens and it has been found that the combustibility of the coke from the lower part of the ovens is the same as that taken from the upper part of the ovens. It was further shown that the shatter tests from the upper part of the oven are virtually the same as the shatter tests from the coke produced in the lower part of the oven. This indicates that besides very uniform size of coke produced in this new oven, the characteristics of the coke from different parts of the ovens show great uniformity.

"In making coke of 11 hours in this new design of oven, the temperature of the flue walls did not exceed the maximum of 2,550 deg. F. and the fuel consumption in coking Pittsburgh coals was equivalent to 1,050 B.tu. per pound of coal.

The advantages claimed for this new oven are as follows:

1. Greatest simplicity of design.
2. Perfect distribution of heat in such a way that the coking within the coal charge progresses uniformly at all places, thus preventing any over and under coking.
3. Increased capacity per oven unit.
4. Lowest fuel gas consumption.
5. Maximum strength of oven walls.
6. Lowest pressure differentials throughout the entire oven system.
7. Complete absence of counter-flow between flame flues and gas supply flues and gas regenerators.

Distillation Gases Yielded by Trent Amalgams

Ethylene Found Therein as a Source of Alcohol.

By J. D. DAVIS, Research Chemist, Pittsburgh Experiment Station, U. S. Bureau of Mines

Sixty years ago, M. Berthelot found that ethylene could be selectively absorbed from gaseous mixtures by concentrated sulphuric acid, and that the compound formed by the chemical union of the gas and acid was readily decomposed by heating with water, yielding ethyl alcohol. Only within the last few years has there been any attempt to make use of this discovery technically. Bury, working in England at the Skinningrove Iron Works and on a commercial scale, developed a technical method for converting the ethylene of coke-oven gas into alcohol. With a gas containing less than 3 per cent of ethylene, he obtained a yield of 1.6 gallons of alcohol per ton of coal carbonized.

De Loisy perfected a technical method for treatment of coke-oven gas for alcohol. Evidently this work was carried out on a semi-commercial scale. His method is based on the use of catalytic agents for hastening the absorption of ethylene by sulphuric acid. He uses part of the spent acid for drying the gases and part for the manufacture of ammonium sulphate. Excess acid is reconcentrated by waste heat. Others have worked on the problem, but so far there has been no large recovery of ethylene from coke-oven gases. The chief difficulty seems to lie in the low efficiency (about 50%) of methods and the relatively low concentrations of ethylene in the gases treated. Gas from Trent amalgam* contains much larger percentages of ethylene than does coke-oven gas, as will presently be shown, and if it should ever prove practical to treat industrial gas for alcohol, this gas would offer attractive possibilities.

Method Used in Carbonizing Trent Amalgams

The method used here to carbonize the amalgams differs from any now used for the commercial carbonization of coal. In ordinary practice, coal charges are distilled at all temperatures from the decomposition point of the coal to the highest retort temperature, and no definite temperature can be fixed on as the temperature of distillation. With the method here used, the distillation range was made narrow. This was effected by feeding the charge regularly into a retort kept at constant temperature—that is, the predetermined distillation temperature. Distillations were conducted at temperatures 400, 500, 600, 700 and 800 deg. C., and the gases evolved were measured and analyzed. Samples of the coal and oil used to prepare the amalgams were distilled under the same conditions as were the amalgams for purposes of comparison.

Experimental Results

The materials used in the experiments were Illinois coal obtained from the Big Muddy Coal and Iron Co., Herrin, Ill., and an asphaltic base fuel oil. An analysis of the coal follows; also the fractionation results for the oil. Table I gives the analyses of gases evolved from amalgam, coal and oil at temperatures 400, 500, 600, 700 and 800 deg. C., together with total yields of gas and light oils scrubbed from the gas. Results for the 700 deg. amalgam run are not reported, owing to the fact that precipitated carbon clogged the mains and rendered the gas samples taken of doubtful value.

In general, the oils give higher yields and richer gases; the amalgams give somewhat less gas of poorer quality; and the coals give the lowest yields

*A paste consisting of approximately 2 parts finely pulverized coal and 1 part oil such as that obtained as a final product in the Trent process for cleaning coal.

and the poorest gas. It is an interesting fact that the run at 800 deg. C. (with continuous feed) gave almost as much gas for the amalgam as for the oil, and gave a gas of slightly better quality. At this temperature, it thus appears that Trent amalgam is just as good material for making commercial oil gas as the oil itself. The amalgam would of course be the cheaper, and, further, it will be noted that under these conditions more oil was scrubbed from the amalgam gas than from the oil gas. Of course, if a rich oil gas is wanted, the best procedure is to crack the straight oil at a lower temperature.

The percentages of oxygen-containing gases for the coals and amalgams are considered somewhat high. This is due partly to the method of feeding the retort, and partly to the fact that the coal used was of high oxygen content. As for the first cause, the charge fed was finely divided, and must have carried into the retort a fair amount of absorbed air.

Unsaturated Gases

The percentages of unsaturated gases are uniformly higher for the oil except with the run at 800 deg. C., where the amalgam gives the highest percentages. The coals give the lowest percentages of unsaturated gases, but slightly higher, perhaps, than would be obtained by commercial methods of carbonization. The amounts of these bodies found for the amalgams are intermediate between those for the oil and coal. Unsaturated gas is reported here as ethylene (C_2H_4), and it is probable that 95 per cent of it actually was ethylene. Especially is this true when it is considered that the gas had passed a charcoal scrubber, which would have a tendency to remove heavier gases.

Analysis of Materials Used
Big Muddy Coal

	Per Cent
Moisture	5.78
Volatile matter	31.87
Fixed carbon	52.42
Ash	9.93
Total	100.00
Sulphur	1.28

Fractionation of the Navy Fuel Oil

Temperature Range, °C.	Per Cent Distilling
130	First drop
130 to 225	1.1
225 to 250	4.83
250 to 275	14.25
275 to 300	20.10
300 to 325	21.70
325 to 350	30.90
Residue	5.82
Loss	1.31

Specific gravity of the oil at 20 deg. C., 0.868.

Table 1—Analyses of Gases From Trent Amalgams, Coal and Oil

Charge	Temp., °C.	CO_2	C_2H_4	O_2	CO	CH_4	C_2H_6	H_2	N_2	B.t.u. per cu. ft.	Yield, cu. ft. per ton	Oil from gas, gal. per ton	Remarks
Amalgam	400	9.8	23.4	0.6	4.0	29.1	17.3	8.9	6.9	1000	750	0.38	
Coal	400	17.9	0.5	0.4	11.7	46.7	0.0	17.4	5.4	550	980	1.5	
Oil	400	15.5	16.6	0.0	1.0	23.2	39.1	4.6	0.0	1182	600	0.0	
Amalgam	500	3.0	17.0	0.0	5.3	37.4	12.0	25.0	0.3	937	4470	3.0	
Coal	500	10.2	1.3	0.6	19.7	38.4	8.5	12.2	8.6	779	2970	0.1	
Oil	500	0.6	39.6	0.4	0.5	29.3	24.1	2.9	2.6	1353	5300	2.6	
Amalgam	600	3.0	8.8	0.6	8.7	50.8	0.0	25.3	2.8	730	10650	8.4	Continuous feed.
Amalgam	600	3.3	13.6	0.6	7.5	49.4	0.0	23.9	1.7	794	5650	3.6	Batch distillation.
Coal	600	4.7	3.3	0.5	11.4	30.6	0.0	46.2	3.3	525	6430	4.5	
Oil	600	1.8	31.0	0.5	1.8	46.3	10.8	5.0	2.8	1167	16900	11.1	
Amalgam	700	..	..	..	..	..	..	..	..	....	....	..	Gas samples uncertain
Coal	700	6.4	0.6	0.5	28.1	13.0	0.0	46.9	4.5	370	10750	2.1	
Oil	700	0.4	23.2	0.5	0.5	63.6	2.0	8.3	1.5	1056	19320	7.0	
Amalgam	800	4.9	8.9	0.7	6.7	35.3	8.1	31.5	3.9	757	19800	4.1	Continuous feed.
Amalgam	800	4.7	6.1	0.0	7.9	32.9	5.4	36.9	3.4	654	3400	20.2	Batch distillation.
Coal	800	4.2	3.0	0.4	16.5	26.6	0.0	45.4	3.9	496	10000	0.55	
Oil	800	2.1	2.2	0.0	1.6	63.7	0.0	28.2	2.3	710	20050	2.1	

Yields of Unsaturated Gases from Amalgams

Table 2 gives the yields of unsaturated gases from amalgams at the corresponding temperatures of distillation, and their equivalents in alcohol assuming complete recovery. As a basis of comparison of yields, we may take Bury's figure of 1.6 gallons of absolute alcohol per ton of coal charged in by-product ovens. Assuming a 50 per cent recovery, this would mean a possible yield of only 3.2 gallons of absolute alcohol per ton of coal from coke-oven gas, whereas

(*Continued on Page 656*)

As the Journal Views It

Haynes on Municipal Ownership

Some of the fallacies of municipal ownership and operation of public utilities are told in a paper printed in another section of this issue. The arguments were delivered by Paul P. Haynes, former member of the Public Service Commission of Indiana, during the course of an address before the National Convention of City Managers held in Kansas City, Mo.

Mr. Haynes has spent years in the study of this question and his remarks accordingly carry great weight. The facts cited by Mr. Haynes are worthy of consideration by every gas man for they tell the story of the failure of municipal ownership better than could volumes of generalities.

We would like to point out one paragraph that particularly impressed us in Mr. Haynes' speech. It reads:

"One of the reasons for this failure of municipally owned plants is the lack of foresight or the political impossibility of acting on foresight, in providing for future growth and adequate reserve plant."

Therein is told one of the great objections to this form of rendering public service. It has so often proven to be the case that it has become almost axiomatic.

The comparison of rates, which is a favorite argument of municipal ownership enthusiasts, also is considered by Mr. Haynes, who points out that the basis is wrong because of the fact that a study of the history of municipally owned plants has shown that these rates, which are usually only slightly lower, are kept down at the expense of the plant. That is, that there is no reserve created for taking care of depreciation of the plant.

We recommend that every reader of the AMERICAN GAS JOURNAL carefully read Mr. Haynes' speech.

New York City and the Coal Shortage

During the past week there has been a great deal of excitement among the officials of New York City over the coal shortage. The refusal of the people to use substitutes for domestic sizes of coal and a cold snap drove home to all the fact that there is an acute shortage and that the city is threatened with real suffering unless some drastic action is taken. Mayor Hylan issued an appeal to the people asking that all possible substitutes be used and urged that every family be as saving as possible in the use of the fuel.

New York State has an emergency law covering the situation caused by the coal strike of last winter and the fuel administrator for the state has been given real power to enforce his rulings.

As was to be expected, there has been a heavy demand created for gas for heating homes, and it is worthy of note that at this writing not one company has been found wanting. The larger companies serving New York City some time ago issued requests that gas be conserved so far as possible, but it is not known just what result these requests have had. It is probable that it will be necessary to again warn consumers against wasting gas.

But it is significant that those very people who last summer expressed their complete indifference to the coal strike and who ignored the warnings that were issued are among the first to complain over the lack of coal and who now declare that they must be protected at any cost.

Undoubtedly during the coming months all gas companies will be called upon to supply demands that are absolutely unprecedented, and this will serve as an opportunity to demonstrate to the public the desire of the industry to do its part.

President Brown Optimistic

President R. B. Brown of the American Gas Association, in his first public statement since his election to office, sounds an optimistic keynote when he declares that the future of the industry has never been as promising. He predicts that the business will double in the next decade exactly as it did during the past ten years.

This statement is very encouraging, coming as it does at this time, and should have an excellent effect. Mr. Brown points out that the problem of financing the business is tremendous, but he declares that he believes that the growth will be largely financed by the customers themselves.

Mr. Brown, as president of the national association and through his connection with the Milwaukee Gas Company, is in a position to obtain information on which, undoubtedly, his statement is based.

We concur in his opinion that the industry is facing a magnificent growth.

Distillation Gases Yielded by Trent Amalgams

(*Continued from Page 654*)

from Trent gas there is possibly from 3 to 32 gallons per ton of amalgam charged. It would thus seem that Trent gas is ideal (second only to oil gas) for the application of an alcohol recovery process.

Table 2—Yields and Alcohol Equivalents of Unsaturated Gases From Amalgams

Temp., °C.	C_2H_4, Per Cent	Total gas, cu. ft.	C_2H_4, cu. ft.	Alcohol equivalent gal. per ton
400	23.4	750	172	3.1
500	17.0	4,400	760	13.8
600	8.8	10,850	955	17.3
800	8.9	19,800	1,760	32.0

Recovery of Ethylene as Alcohol.

So far it has not been possible to recover from coke-oven gas more than 50 per cent of ethylene contained as alcohol, but it would undoubtedly be possible to improve this figure considerably by research. The problem offers possibilities, particularly in connection with the rich Trent gas. For example, De Loisy found that he could increase considerably the speed of absorption of ethylene by sulphuric acid through the use of catalytic agents, and thereby increase the recovery of alcohol.

Loss of Heating Value Through Removal of Ethylene From Gases

Table 3 shows that the loss of heating value suffered by Trent amalgam gases on removal of the ethylene is not an important consideration. They are rich gases to start with, and the removal of ethylene, although that gas has a high heating value, does not bring their heating value below that of the best industrial gases.

Table 3—Effect of Removal of Ethylene on the Heating Values of Trent Amalgam Gases

Distillation Temp., °C.	B.t.u. per cu. ft., raw gas	B.t.u. per cu. ft., scrubbed gas
Mines.		
400	1,000	798
500	936	795
600	726	639
800	757	671

It may be stated further that the ethylene in the composite gas has a market value much below that which it would have as pure gas. For example (see Table 2), a 600 deg. distillation will yield 10,850 cubic feet of composite gas, 955 cubic feet of which is ethylene. The ethylene if recovered commercially pure would be worth 1 cent per cubic foot or $9.55, whereas all the gas (at 50 cents per 100) would be worth about $5.40.

Conclusions

1. Trent amalgams yield gases intermediate between those from coal and oil in respect to both quantity and quality.

2. The high percentage of unsaturated gases from Trent amalgams offers a promising field for research.—*Reports of Investigations, U. S. Bureau of Mines.*

Exibit of Lake Charles (La.) Gas Company at First Annual National Rice Day Festival, Calcasieu Parish Fair.

Shortage Continues in Domestic Sizes of Anthracite

Washington, D. C.—After a survey of the present coal situation in Pennsylvania, New Jersey and New York, it is apparent that, although there is sufficient coal in the United States, there is a definite and continuing shortage of domestic sizes of anthracite, according to Federal Fuel Distributor C. E. Spens. It will not be humanly possible to make up during this winter the shortage in these sizes, which will amount to approximately 40 per cent, states Mr. Spens.

The available sizes of domestic, as well as those of all other anthracite sizes, have been allocated to the various states in proportion to their normal consumption, and every effort is being made for equitable distribution along this line. Should one state seize any of the coal allocated to any of the neighboring states, the latter will be short just so much coal, and the effect might be far-reaching, the Federal Fuel Distributor points out. For instance, if New York State should seize coal intended for the Great Lakes districts, it is conceivable that New Jersey would feel free to seize coal passing through that State to New York and that citizens of Pennsylvania might also feel free to seize the product of their own State rather than have it go into New York, New Jersey or elsewhere.

Where a community seizes coal intended for another community in the same state, the one community benefits temporarily at the expense of the other, but is liable to reprisal. In other words, the burden is general, and attempts at taking the law into one's own hands will only tend toward chaos and shortage all around.

On Tuesday, November 28, there were 1,138 cars of steam sizes of anthracite at Hudson River terminals awaiting orders from New York. The failure of domestic consumers there to avail themselves of these substitutes leaves many householders with insufficient coal and holds all of these cars idle when they are greatly needed.

Why Municipal Ownership Has Proved a Failure*

"Is Essentially Wrong Regardless of Form of Government"

By PAUL P. HAYNES, Former Public Service Commissioner of Indiana

Municipal ownership of public utilities is essentially wrong regardless of the form of city government. Municipal ownership of public utilities in city manager cities is fundamentally as unsound as in cities governed by the system of mayor and council.

I believe in the city manager system and city agreement and have helped to enact city manager legislation.

The city manager system, however, has not, will not and cannot change or materially modify the inherent *political* character of city governments, and it is the *political* foundation underlying all city governments which will always prevent the successful public ownership and operation of utilities.

Public utilities, notwithstanding their non-competitive position, are industries furnishing an essential service, the success or failure of which is controlled almost entirely by the broad, deep-rooted and fundamental laws of economics and business—the identical laws which govern the success or failure of all private industrial and commercial enterprises.

Public utilities require the constant application of sound business judgment, expert operation, skilled management and above all continuity of wise business policies.

No city primarily governed by popular rule possesses, or can be certain that it will long possess, these qualifications so essential to the public utility business. No city, the policies of which are determined by popular vote, can long continue to apply sound economic principles and business methods to its ownership and operation of utility properties—and the simple reason is that cities are essentially *political* agencies—not necessarily partisan, but broadly speaking—political.

And, what are business principles between politicians? Of late we have heard a demand for less politics in business. This truism finds its most convincing application in the public utility business.

Public Managers Limited in Action

City managers are almost exclusively *administrative* officers. They have little or no legal control over municipal legislation or policies. The city commission or council is the legislative or policy determining body. It is a political body elected frequently and so far as utility matters are concerned is constantly subject to the will of the electorate. In important matters of policy connected with the operation of public utilities, the city manager administers or executes what the commission or council ordains or legislates.

If an uninformed or ill-advised majority of the voters demand lower rates, the city will have lower rates, although the service may be impaired and the business become insolvent. The city manager, no matter how capable, cannot stop it.

If adequate and continuous service demand the creation of a depreciation fund—the plant will have no fund if the politicians organize against it. The city manager cannot force it.

If thousands of dollars are needed to rehabilitate in order to render adequate service the plant and the commission or council refuses to appropriate the money—the public suffers and the city manager cannot help it.

A casual study of municipal operation shows that frequently the thing that has been best for the municipal plant, and the thing the public most needed in the way of service or rates, was unpopular with the majority of voters and could not be obtained.

The desirability of municipal ownership of public utilities, broadly speaking, cannot be determined unless the purposes of and reasons for public ownership are clearly understood. What are the asserted purposes of popular ownership of utilities? The sole business of public utilities is to render service to the public. It must necessarily follow that the reason or purpose of municipal ownership is to render better service to the public than can be rendered privately, or the same character of service at lower rates.

If it could be established that popular ownership does these things, then it might be conclusively argued that so far as this less fundamental phase of the question is concerned, municipal ownership of public utilities is desirable.

From quite an extended, and I may say unprejudiced, study and personal familiarity with the popular ownership and operation of a large number of utility properties of various kinds, I have found that on the average the service rendered by popularly owned utilities is inferior to the average service rendered by privately owned utilities.

One outstanding example of this fact which a casual investigation will show, is the record of outrages or breakdowns in municipal electric plants as compared with the record of private plants. A breakdown in a plant which causes a suspension of service, results not merely in the inconvenience of the average consumer, but in the stopping of factories and industries generally, and in many cases, the loss of thousands and hundreds of thousands of dollars, and the suspension of essential production.

Sound Business Judgment Possible

One of the reasons for this failure of municipally owned plants is the lack of foresight or the political impossibility of acting on foresight, in providing for future growth and adequate reserve plant.

The general experience has been that municipal plants have failed and neglected to install additional generating capacity until long after there was an urgent need for it.

Frequent administrative changes resulting from frequent municipal elections, prevents, and will continue to prevent, the exercise of sound business judgment and foresight in the management and operation

*Address delivered at the National Convention of City Managers, Kansas City, Mo.

of municipally owned utilities, and without these essentials the public will always receive inferior service from such utilities.

It is true that exceptions may be taken to this statement, and certain municipal plants may be cited that are rendering unusually good service. The test, however, is not to be made by the few, but by the many, and the test cannot be made with 1, 2 or 5 or 10 years' experience, but it must be the average experience over a long period which will determine the facts as to the quality of service.

I state it as a fact, based on first hand knowledge of a large number of properties, that the service rendered by municipally owned plants is inferior to the service rendered by privately owned plants.

Going back, therefore, to the original proposition that one of the reasons for municipal ownership is that municipal plants can and do render better servive, it is obvious that this reason cannot be supported and must fall. Let us now go to the other reason, that service can be rendered by municipal plants at lower rates.

It may be admitted at the start that municipal plants can and do render inferior and less adequate service at rates lower than the rates which a privately owned plant is required to charge in order to render adequate service. It is a matter of record, however, in practically every state in the Union, that municipal operation of public utilities is more expensive and less efficient than under private ownership.

Take, for example, the State of Indiana with which I happen to be fairly familiar.

A comparative study has been made of the costs of operation of all municipal and private plants. The results of this study show that of every $100 of revnues received, the private electrical plants in the year 1920 spent $79.18 for operating expenses, and the municipal plants spent an average of $89.69, and included in the private electric plant expenditure is $7.26 for taxes for which the municipal plants had no expense.

In other words, for 1920, out of every $100 of revnues received, the municipal plants in Indiana spend $17 more for operating expenses than did the privately owned plants.

In 1920, out of every $100 of revenues collected by water plants, the privately owned plants expended $63.86 for operating expenses, including $16.05 for taxes as compared with $74.55 expended by the municipal plants which included no taxes.

In other words, to put it on a comparative basis, out of every $100 received, the municipal water plants spent approximately $26.75 more for ordinary operating expenses than did the privately owned plants.

In 1921, out of every $100 of revenues, the privately owned electric plants expended for ordinary operating expenses, excluding taxes, $63.93 as compared with an expenditure of the municipal plants of $73.44.

In 1921, out of every $100 of revenues, the privately owned water plants expended for ordinary operating costs, excluding taxes, $45.39, as compared with an expenditure by municipal water plants of $73.86.

I have made a sufficient study of the comparative results of operation in other states to convince me that the general experience throughout the country coincides with the experience in Indiana.

It must be apparent to the unprejudiced student of this question, that the extravagance, waste and inefficiency which is generally found in municipally owned plants is a telling argument against popular ownership and discloses an unhealthful condition of civic affairs.

So-Called Lower Rates Fictitious

I am familiar with the fact that generally the rates charged by municipal plants are slightly lower than the rates charged by privately owned plants. It must be understood, however, that it is impossible to base any conclusions as to the desirability of municipal ownership merely on a comparative rate basis, for a study of the history of municipal plants will almost invariably disclose the fact that low rates have been maintained at the expense of the property itself.

Municipal plants generally have not been well maintained. Depreciation reserves are seldom carried.

A new plant will be built, and there will be great public rejoicing, but soon the public has lost interest in the up-keep of the plant, and the primary public interest centers in low rates. It soon becomes unpopular to talk of increasing the rates, so those who are responsible for the operation of the plant have no choice in the matter. They sacrifice the plant to satisfy the popular demand for low rates.

So it is that in the case of the large majority of municipally owned plants, the time comes when they are run down and the service becomes so impaired that it is necessary to re-build and re-habilitate the property. And then what happens?

Almost always the city sells its municipal bonds to re-build the plant, when had the proper course been followed, wise and proper business methods would have required higher rates over the preceding years in order to have enough money to keep the plant well maintained, and to have permitted the accumulation of depreciation reserves to replace the property and units of the property when they are worn out.

Now when bonds are issued and sold to rebuild the plant, all of the taxpayers of the city, regardless of the benefits which they derive from the municipal plant, are assessed. The taxpayers are required to rehabilitate the municipal plant for the benefit of those who during the preceding years have failed to pay rates sufficient to keep up the plant.

In order, therefore, to compare rates, it is necessary in the case of municipal plants, to determine and give consideration to the higher level of rates which would have been necessary had the property been well maintained and proper allowance made for depreciation and other necessary expenditures.

It is apparent, therefore, that because municipal plants do furnish some kind of service at lower rates is no conclusive argument for municipal ownership.

It is a matter of common knowledge that during the war period, it was the boast of many municipal plants that the rates were not increased. From an economic and business viewpoint this was a shameful situation. Before the war, many municipal plants

in the Middle West were able to buy coal delivered at less than $3 per ton. These same plants, during the war period were forced to pay as high as $10 or $12 per ton for coal; and the cost of coal constituted one-half or more of the total operating expenses.

No private business can ever compete with such uneconomic and unbusiness-like administration, and they should not compete.

Cities Deceive Themselves

During these years, the public in these cities deceived themselves. The public believed or was led to believe that because they owned their own plants they could be operated without an increase in rates.

Today, scores of municipally owned plants are suffering the disastrous consequences of these years of mismanagement.

The failures of municipal plants—is not the record of failures a conclusive answer to the advocate of municipal ownership?

I have with me a record of more than 300 cases where municipal light plants have failed or have been abandoned. In many cases, the plants were sold to private companies. In other cases, the plants were merely shut down and electric current purchased. I am reliably informed that there are at least 500 municipal electric light plants in the United States which have wholly or partially gone out of business. Is not this an eloquent testimonial of the fundamental error of municipal ownership?

There is a very practical and decisive objection to municipal ownership under any form of city government. Several classes of public utilities, in order to serve the public more adequately and at lesser rates have rapidly developed beyond municipal boundaries.

Take for example, the electric utilities. The day of the isolated plant is passed. The modern development which is giving the public better service at lower rates is toward the construction of super-power plants at points where fuel and transportation are cheaper and where there is an abundance of water for condensation purposes—or on streams where hydro-electric power may be generated. These super-power plants are in many cases being located in the open country entirely away from cities. High voltage transmission lines carry the electric energy to many cities, towns and villages.

It will be but a few years until the entire country will be webbed with inter-connecting high power transmission lines. The isolated power plant will be no more, and the small generating station will disappear. Maximum economies and efficiencies will be developed, service will be better and rates lower. New industries will spring up and old ones will be able to expand, and out of it all the public will be the greatest beneficiary.

Municipal ownership of electric plants would make this notable achievement impossible.

The telephone is another striking example of the impracticability of municipal ownership, and what I have said about the electric industry applies measurably to that of railway, gas and other utilities.

The cry for municipal ownership was occasioned by conditions which have long since been changed. The principal reasons formerly assigned for municipal ownership no longer exist. State regulation of public utilities has come and has proved itself effective. Public service commissions, by their notable achievements, have given a conclusive answer to the proponents of municipal ownership.

Regulation Has Corrected Faults

The states have provided a scientific, equitable and speedy method of regulation. The size of the state removes its supervision from local prejudices and yet is sufficiently close to both the city and utility to enable it to regulate intelligently and equitably. Wise and unprejudiced state regulation of a local utility is a distinct advance over either locally regulated or owned utilities.

State regulation has corrected the chief abuses which the original advocates of municipal ownership believed to exist. The state is the sovereign, and from it must come whatever power a municipality may have. The state is the logical unit to provide regulation for public utilities.

Municipal ownership is nothing more or less than an exaggerated form of municipal regulation, for the city admittedly does not go into the utility business to make money. Few will argue that we should now abandon state regulation and go back to local control.

There is a form of public ownership of utility properties which gives the public the full benefit of wise and prudent business management, individual initiative and efficient and economic operation. This character of public ownership is that in which the public, through its individual members, becomes the owner of the stocks and the bonds of the utility property—consumer ownership of well managed utilities which will result in better service at lower rates than popular ownership with its uneconomic policies, mismanagement and the multitude of attendant ills.

The problem of municipal ownership is not to be decided by consideration merely of the practical phases. To me, the problem is far more fundamental, it is fraught with sinister perils to the institutions of our government itself. We should not and we can not close our eyes to the fact that with the modern economic and social developments, the question of municipal ownership must be approached not as an unrelated and isolated question, but it must be approached as one phase of a significant tendency in American life, the continuance of which may lead to the ultimate destruction of our republican form of government.

What difference is there fundamentally between the ownership by a city of an electric plant which serves those living within the confines of that city, and the ownership by the State or the National Government of the agencies of city and national service?

Every reason for municipal ownership of a public utility is, by the same token, a reason for nationalization of all necessary industries. Are we ready to take this step? Are we willing to give up the liberties and freedom of individual action which we now possess?

We no longer hear as much about municipal ownership of telephone or electric properties, due to the fact that these utilities are no longer confined to city limits, but already we do hear a far more sinister demand for state ownership of electric and telephone utilities.

Where will they stop? Where will the advocates of municipal ownership halt?

Will they in their zealous pursuit of a vain idealistic fancy, blindly strike at the foundations of our established government? Do they propose to carry their ill-pre-

mised argument to the inescapable demand that the cities and other governmental units should own and operate all industries and business which now or hereafter may be declared public utilities?

The advocate of municipal ownership proceeds on the fallacious theory that because the state finds it necessary to regulate a business, it immediately follows that the city should own it.

The several states of the Union, due to the necessity of regulation, are continuously creating new classes of public utilities. In addition to those which we generally contemplate, many states have declared grain elevators, warehouses, motor busses and others to be public utilities. If the ownership advocate is right, these likewise must be publicly owned and operated.

Ownership of All Business Goal

Many states, doubtless, will find it necessary in the future to regulate other business enterprises. Let us assume that a state believes it necessary to regulate the price of coal, steel, clothing, ice and food products as well as other necessities. Now, if the municipal advocate is right about electric, gas, street railway and other utilities, he must, in such a situation, demand the public ownership and operation of these additional enterprises.

Is it not but a step from local ownership of utilities to state and national ownership of all necessities, and is this not what we know as communism, under which our government cannot survive? Is this not the socialization of all industries which already has brought calamity to other nations?

I cannot believe that the ownership advocate would stand for such a revolutionary development in American life, and if he does not profess or stand for such a revolutionary development, he is fundamentally wrong in advocating the public ownership of these enterprises which have so far been declared to be public utilities.

However that may be, the path which the municipal ownership advocate is blazing leads inevitably to government ownership of all public necessities and to the destruction of the whole fabric of our national government.

He will honestly deny this assertion, but the trouble is that he does not know where he is going. He has ignored the broader aspects of the question and does not realize that, unwittingly, he may be lighting the torch, which, fanned by an aroused spirit of unrest and discontent may start the fatal conflagration which, in our land, the torch bearers of more revolutionary purposes have so far failed to kindle.

Utility President Placed on Pa. R. R. Board

A. W. Thompson, President, Philadelphia Company of Pittsburgh, Pa., was elected as a director of the Pennsylvania Railroad Company on Wednesday, November 22. The news of Mr. Thompson's election is received with general pleasure among utility executives.

Mr. Thompson brings to his new honor not only a wide knowledge of general business affairs but one of the railroad business as well. Before he became president of the Philadelphia Company and administrator of the very large and diversified interests affiliated with it, he had learned the railroad business from the bottom up. The gas industry is to be congratulated upon his selection.

Off for the Game

Col. George D. Roper, head of the George D. Roper Corporation, aside from turning out Eclipse stoves, is a dyed-in-the-wool football fan, especially when his home town of Rockford, Ill., is concerned. The other day the Rockford High School football team was scheduled for a stiff contest with a rival team in the opponent's home town. Mr. Roper, in accordance with his annual custom, declared a holiday for all his office employees who desired to witness the match. Then, chartering a special Interurban car, Colonel Roper piloted the eighty odd members of his organization, who could squeeze into the car, to the scene of battle. The accompanying photograph shows the Roper delegation as it was about to start from Rockford. Incidentally, Rockford High won, and, needless to say, every member of the visiting delegation shared in the victory.

Comparison of Kentucky and Scotch Oil Shales

Assay tests on Kentucky and Scotch oil shale samples have recently been completed at the Boulder, Colorado, field office of the United States Bureau of Mines. The Kentucky shale yields a relatively small amount of oil (15 gallons of crude and 1.4 gallons of scrubber naphtha), and the oil is of very asphaltic nature, its specific gravity ranging from 0.926 to 0.947, depending on the rate of retorting. The influence of rate on the quantity and quality of motor fuel fraction is shown remarkably well by the results of this work. The most rapid run yields an oil producing 21 per cent motor fuel fraction, with an unsaturation of 39.7 per cent, and the slowest run yields an oil producing 25.8 per cent motor fuel fraction with an unsaturation of 32.4 per cent. The gas produced from the Kentucky shale runs high in hydrogen sulphide and low in carbon dioxide. The Scotch shale yields the best oil thus far produced in the laboratory. It is decidedly of a paraffin nature, and although complete tests on the oils are not available, the percentage of unsaturation in the motor fuel fractions is quite low. The gas produced from this shale contains as much as 35 per cent of carbon dioxide, and this of course cuts down its fuel value.

Public Utilities Securities Market Report

Prices of Representative Gas Bonds

(Quotations furnished by The National City Company)

Company.		Maturity	Dec. 7, 1922 Bid	Asked
American Lt. & Trac. Co.	Five Year 6s	May 1, 1925	109½	110½
Brooklyn Union Gas Co.	First Consol. 5s	May 1, 1945	95	96½
Columbia Gas & Elec. Co.	First 5s	May 1, 1927	95½	97
Consol. Gas, Elec. Lt. & Pr. Co. of Baltimore	First Ref. 7½s	Dec. 1, 1945	110	111
Consol. Gas, Elec. Lt. & Pr. Co.	General 4½s	Feb. 14, 1935	90	92
New Amsterdam Gas Co.	First Consol. 5s	Jan. 1, 1948	84	86
Denver Gas & Elec. Co.	Gen. (now 1st) 5s	May 1, 1949	92½	94
Detroit City Gas Co.	Gold 5s	Jan. 1, 1923	100	—
Equitable Illum. Gas Lt. Co. of Philadelphia	First 5s	Jan. 1, 1928	99½	102
Hudson County Gas Co.	First 5s	Nov. 1, 1949	92	94¼
Laclede Gas Light Co.	Ref. & Ext. 5s	Apr. 1, 1934	92	93
Louisville Gas & Elec. Co.	First & Ref. 7s	Called Dec. 1	100	—
Michigan Light Co.	First & Ref. 5s	Mar. 1, 1946	91	93
Milwaukee Gas Light Co.	First 4s	May 1, 1927	92⅝	93¼
Pacific Gas & Elec. Co.	Gen. & Ref. 5s	Jan. 1, 1942	91	92
Pacific Gas & Elec. Co.	First & Ref. 7s	Dec. 1, 1940	105½	—
Cal. Gas & Elec. Corp.	Unif. & Ref. 5s	Nov. 1, 1937	94⅛	95¼
Peoples' Gas Lt. & Coke Co.	Refunding 5s	Sept. 1, 1947	89½	93
Chicago Gas Lt. & Coke Co.	First 5s	July 1, 1937	93¼	97¾
Portland Gas & Coke Co.	First & Ref. 5s	Jan. 1, 1940	90	92
Seattle Lighting Co.	Refunding 5s	Oct. 1, 1949	82½	85
Southern California Gas Co.	First 6s	Nov. 1, 1950	96	98½
Utica Gas & Electric Co.	Ref. & Ext. 5s	July 1, 1957	91½	—
Washington Gas Light Co.	General 5s	Nov. 1, 1960	95	95½
Western States Gas & Elec. Co. of California	First & Ref. 5s	June 1, 1941	91	93

Consolidated Gas Holders Approve Preferred Stock

Special stockholders' meeting of Consolidated Gas Co. of New York Dec. 4 approved increase in capital from $125,000,000 to $140,000,000, the additional $15,000,000 to consist of 300,000 shares of 6% cumulative participating preferred stock of $50 par value. This stock is to be offered later to employees and consumers for purchase.

Action on changing present $125,000,000 of $100 par common stock to no par value common, with exchange of two no-par shares for one present common share, as well as authorizing sale of 500,000 shares of new no-par common at $50 each to common holders, will be acted upon at another meeting. Due to certain legal requirements, two meetings of stockholders are necessary.

The vote on the approval of the $15,000,000 preferred stock and of its sale to consumers and employees, resulted in 1,013,740 shares approving this issue, while 4,025 shares voted against it. Those voting in favor of the issue represented 81.46 of the outstanding stock which Chairman Garver pointed out was the largest vote on any question ever made by the stockholders of Consolidated Gas. Those voting against the resolution represented less than one-third of 1% of the outstanding stock. Only two-thirds of the stock was required for approval of the issue.

President Cortelyou presented the resolution providing for the authorization and sale of the $15,000,000 preferred stock. No announcement of the plan of subscription by employees and consumers has yet been made, but the terms of the resolution plainly indicate that there will be no active market for the new preferred stock. This is shown by the provision that the owner of the preferred cannot sell his shares without giving the company 30 days in which to buy the stock. The price which the company will pay depends on the dividends paid on the preferred stock for the year previous to purchase. Thus, a price of par ($50 a share) plus 5% will be paid when a dividend of 6% was paid the previous year; if between 6% and 8% had been paid the year previous, the company would pay par plus 10%, while par plus 15% would be paid if dividends of 8% or more had been declared.

The new preferred is callable only as a whole at 107½% if the dividend was 6%; 112½% if dividend was between 6% and 8%, and 117½% if 8½ or more had been paid in dividends the previous year.

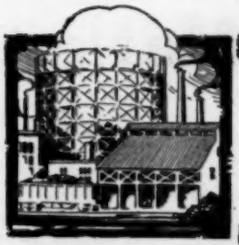
Some stockholders expressed a desire to subscribe to preferred, but the chairman pointed out the company was seeking to have the preferred stock scattered among its 23,000 employees and the many thousands of consumers. He also pointed out that the preferred stockholders would have no voting power and no right to subscribe to additional stock.

Standard Gas & Electric Co.

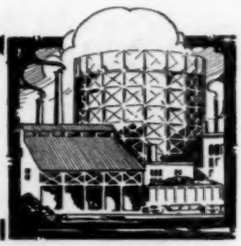
Report of the Standard Gas & Electric Co. and its properties shows gross of $36,726,524 for the 12 months ended Oct. 31, 1922, an increase of $1,962,040 over the same period of 1921. Net after taxes was $13,464,475, an increase of $1,498,855.

General Gas & Electric Co.

Report of the combined earnings of the General Gas & Electric Co. and its subsidiaries shows gross of $12,105,941 for the twelve months ended October 31, 1922. Net after taxes was $3,197,304, and balance after charges $762,752.



NEWS OF THE GAS INDUSTRY



Gas Industry Faces Its Greatest Growth, Says New President of National Association

R. B. Brown Believes Better Public Understanding of Problems of Business Assures Progress

"The gas industry never faced a more promising future than it does today," said R. B. Brown, Milwaukee, in his first public statement as president of the American Gas Association. "The business doubled in the past ten years and will more than double again in the next decade," he continued.

"And yet this industry "carries on" under more serious handicaps than does any other that I know of. We are the victims of custom and tradition in our rates, in some details of our engineering practice, and in many of the rules and regulations by which our operations are governed. We do a highly competitive business in many of its aspects, yet our rates do not in anywise follow the costs of the service rendered—a large percentage of our customers being served at a loss, which inevitably raises the price to all others, and this of itself handicaps expansion. Then our rates are almost as hard to change to meet changes in our costs and to meet competitive conditions as were the laws of the Medes and Persians of old.

"Rules governing character of gas to be furnished, have been in the past (and to an extent still are) such as to shut out the use of improved processes and newer methods or more economical materials.

"The principle of regulation of public utilities by the state, has come to stay and rightly so, but unfortunately too often has resulted in removing the incentive to the best efforts of the utilities, which, after all, are human agencies and as such need encouragement to do their best.

"However, all these problems are coming to be better understood by gas men themselves, by the regulatory bodies, and, I believe, by the public. And with understanding will come modification and improvement in all these conditions and the tremendous growth of the past ten or twenty years will be nothing to that to be seen in the years to come.

"The gas industry has become an absolute necessity to modern urban civilization.

"Finances? Yes, that is a tremendous problem, but the great growth of these essential utilities will be largely financed in the future by the users of the service—by our customers themselves, so that's that."

Gas Company Cashier Held Up and Robbed

Highwaymen stole $8,770 in cash and checks for $4,899 in a daylight hold-up in front of the offices of the Public Service Gas Company, Fifth Street and Bergenline Avenue, West New York, N. J., Dec. 5. John P. Conroy of No. 786 Park Avenue, Weehawken, cashier of the company, and his guard, Patrolman Truncillito, of the Union Hill Police Station, were knocked unconscious. The thieves escaped.

Truncillito drove his motorcycle side-car to the gas office about 9.30 A. M., as usual, to take a representative of the company to the Trust Company of New Jersey to deposit money. Conroy came out with a bag containing the money and checks and sat in the side-car.

As he settled in his seat, three men rushed to the machine, and beat Conroy and Truncillito unconscious.

The highwaymen seized the bag and ran around the corner to Fifth Street, where an automobile was standing. Its engine was running and two men were in the car. It went at high speed west in Fifth Street to Hudson Boulevard, where it disappeared.

Conroy and Truncillito were taken to North Hudson Hospital. Conroy's forehead was cut and the policeman had a severe bruise on the head. Both left the hospital after treatment.

A woman witness gave the police two sets of numbers as her recollection of the robbers' license plate. One set was soon eliminated, the car bearing it having been in its garage in Montclair at the time of the crime. Further investigation is being made of the other license number, which was issued to a Somerville resident.

The corner at which the hold-up occurred is the busiest point in the section, usually crowded with women shoppers at that time of the morning, although few persons were there yesterday because of the rain. It is a trolley transfer point into which three trolley lines converge and also a terminal for two bus lines. A traffic policeman is always stationed at the corner as well as three or four trolley inspectors and several bus drivers.

New Gas Company to Have $100,000 Capital

Independence, Mo.—Articles of incorporation for the Independence Natural Gas-Company were filed Saturday in Independence. The company will have a capitalization of $100,000 and headquarters will be in Independence.

The new company will be the successor of the Independence Oil and Gas Company and absorb the property and franchise of that company.

Lindsay Light

Chicago.—President Sherburne of Lindsey Light Co. has announced that federal tax dispute pending for many months has been settled satisfactorily, much below amount first demanded. Operating revenues are reported sufficient to cover preferred dividend requirements.

Indorse U. G. I. Accounting System

The Philadelphia Chapter of the National Association of Certified Public Accountants has indorsed the accounting and cost system of the U. G. I. Contracting Company. This action followed the presentation to the chapter of an explanatory article by Weston J. Hibbs, treasurer of the U. G. I. Contracting Company. Mr. Hibbs is president of the Philadelphia chapter of the accountants and a member of the Industrial Cost Association and of the National Association of Cost Accountants.

The chapter, after hearing Mr. Hibbs' paper, adopted a resolution recommending the U. G. I. cost system for general use by contracting companies throughout the country. The indorsement of the system has as its object the desirability of having in general use principles and methods of cost accounting designed to protect both the interests of the customer and the contractor, particularly where the contracting company's business is mostly done on a cost plus basis.

"There is no claim for originality in this cost system," said Mr. Hibbs, "neither for the principles nor for the methods used in following them out. All that is claimed is that it is a combination of the best and fairest methods of cost accounting that we have been able to find for a business operating under conditions similar to those of the U. G. I. Contracting Company, and that it is the result of over 25 years of experience in cost accounting and of careful study of innumerable books and articles on this question."

Artificial Gas for Cutting Steel and Iron

The Industrial Department of the Public Service Company of Northern Illinois is pushing the use of artificial gas for cutting steel and cast iron. Whatever can be accomplished with acetylene or hydrogen gas in this work can likewise be accomplished with manufactured gas, engineers of the department state.

One of them recently carried through a series of experiments with an operator in a large plant in the territory of the company. Material of various sizes and shapes was cut. A stock of thin plates and a 2½-inch bar were handled with equal ease. The operator placed the tip at right angles to the top face of the 2½-inch square bar and in a very short time had bored a hole clean through it without any tendency to back firing developing. Gray iron was cut in the same fashion as is done with acetylene or hydrogen. The experiment showed that the operation can be carried on rapidly and that the percentage of safety was decidedly increased.

The apparatus for performing this work with manufactured gas is similar to that necessary when oxy-acetylene or hydrogen-oxygen gases are employed. The oxygen arrangement does not require changing and the tip sizes, gauges and working pressures may be identical. In order to pre-heat the metal before cutting begins an intense flame of a reducing tendency is necessary. Manufactured gas differs from hydrogen and acetylene in that a larger volume of it is needed to carry through this preheating. This accession necessitates changes in the number of tip openings. The piping of gas to the location at which the operator works may vary with the layout of the plant and type of work to be done. In a scrap yard, for example, a pipe line with a number of openings will give the operator a chance to locate to the best advantage. In all cases the gas can be pumped to any point and it can be easily arranged to deliver it at the pressure required for the job. This feature carries with it the advantage contained in the use of small pipe lines.

With respect to costs and saving in time manufactured gas makes an excellent showing.

As a result of the experiments described, engineers of the department predict the adoption of gas in the work in several plants.

The demand for gas as fuel in the so-called smaller industries continues to be a feature. It is manifest in a range which includes a large number of establishments.

Gas Rates Fixed by Agreement

Chatham, Ont.—A settlement has been arranged between the Canadian Western Natural Gas Co. and the City of Calgary relative to the supply of natural gas. Under this arrangement until November 1, 1923, the rate will be 48 cents per 1,000 feet, and will then be fixed for one year on an earning basis to the company of 8 per cent on $5,883,000. After November 1, 1924, the rate will be set for periods of three years on the same basis. A reduction of $600,000 is made in the company's capitalization. The company is to provide an adequate gas supply, but the Provincial Government has gone on record as allowing the company to cross road allowances with its pipe lines, thus permitting the piping of gas from the Redcliffe Field. The Alberta Utilities Board will, however, from time to time regulate the amount of gas to be taken from the Redcliffe Field, in order to protect the City of Medicine Hat and adjacent consumers. Gas is to be supplied to Calgary only for domestic purposes; which does not include the heating of business blocks.

The Calgary Settlement does not cover the dispute between the company and the City of Lethbridge, which contends that the city has a franchise providing for a 35 cent rate as long as gas is available.

Adjuncts to Improve Pressure Installing in Three Gas Plants

At Ottawa and also at Streator boosters are being installed in the Public Service Company of Northern Illinois Gas Stations. At the Oak Park plant a blower is being put in.

The plants at the first two named places are low pressure plants. The steady growth of demand has necessitated improvement in each. At Ottawa a considerable increase in holder capacity has been made within the last few years and at Streator various improvements have been completed. The booster performs the function implied in its name. It is a large pump. In practice it enables a control of pressure and the effect of this is a betterment in the distribution.

The blower at the Oak Park plant represents the principle of the apparatus which secures the blast effect in a smelter cupola. Its operation at Oak Park will, as in the cases of the boosters at Ottawa and Streator, have the effect of improving the service.

Reduce Rates in New Bedford, Mass.

New Bedford, Mass.—A reduction to $1.30 in the gross price of gas has been announced by the New Bedford Gas & Edison Light Co. The new rate goes into effect on all bills rendered on and after Feb. 1, and for prompt payment the net price to customers will be $1.20.

Southwestern Association to Meet Next Year in Fort Worth

The Southwestern Electrical and Gas Association will not hold its 1923 convention in Corpus Christi as was at one time hoped. Invitations to the association had been extended by Mayor Lovenskiold and several civic bodies of the city to hold the convention here, and it was believed for a while this city would be selected for the meet, but notice just received by Mayor Lovenskiold brings the information that the meeting next year will be held at Fort Worth instead.

In the letter to the mayor the wish is expressed that the invitation might be extended at a later date for a future meeting of the association here.

With the rapid gas and oil development now going on in the Corpus Christi area it would have been especially attractive to have had the gas men with us for a few days and give them an opportunity to get a first-hand view of the local situation and learn just what the future of the local gas area really means.

It is expected the 1924 meeting of the gas and electrical men will be held here, and when they come there will be found an unlimited supply of natural gas running through the city mains and one of the lowest gas rates for industrial and domestic use to be found in the South.

Promise More Gas After Lines Laid

Buffalo, N. Y.—An additional 5,000,000 feet of gas will be added to Buffalo's supply in the next year, according to an announcement of the Iroquois Natural Gas Company, made after it obtained from the public service commission permission to lay mains from Arkwright in Chautauqua County, to Buffalo. The work of laying the mains from the Senator A. T. Fancher wells to the city will be completed January 15.

A 12-inch main will be laid to the company's mixing plant in Elk Street and Bailey Avenue to carry coke over gas produced at the Semet-Solvay plant.

Kankakee Gas Plant Capacity Increase

It is expected the work of installing the water gas apparatus on the Public Service Company of Northern Illinois Kankakee Gas Plant, of which mention has recently been made, will be completed by the middle of this month. In operation this addition will largely increase the capacity of the plant. The demand on it has shown a considerable growth.

Commission Order Fails to Clear Birmingham Situation

Birmingham, Ala.—The fight between the City of Birmingham and the Birmingham Railway Light and Power Company was still muddled as as a result of an order of the Alabama Public Service Commission this week, which says the company shall be required to install extension of gas lines totaling 162½ feet for a prospective customer and one meter for the measurement of the gas without cost to the consumer. The company, which is in the hands of Lee C. Bradley, as receiver, claims that it has not the money to make the extensions, of which several thousand dollars worth are now being demanded by certain sections of the city. The power concern has maintained that cost of extensions should be borne by the persons benefiting thereby.

The new ruling of the public service commission provides that gas lines totaling 162½ feet to each consumer must be laid by the company without cost and for each additional foot there shall be deposited with the company the sum of 48 cents.

The commission previously had decided that the company must pay $94.30 in constructing lines for the service of each new consumer, but the order did not go into detail regarding what construction work could be done with this amount of money. The latest order provides that the amount of money must establish one meter and 162½ feet of extension. Each foot beyond this amount the prospective consumer is required to deposit with the company 48 cents, which is to be refunded to the depositor with reasonable rates of interest. The new rules became effective as of December 4.

The final rules as promulgated by the utility board constitute a compromise between the demands of the city and those of the Birmingham Railway, Light and Power Company. The question now is whether the Birmingham Railway Light and Power Company will make the extensions, which include about $75,000 in domestic and more than $150,000 in primary or suburban extensions, without further pressure from the public service commission.

The order of the Alabama Public Service Commission regarding gas extension is, in part, as follows:

"Any prospective consumer, other than a commercial consumer, who has executed the regular contract for such service, shall be entitled to an extension without cost to the prospective consumer, providing the cost of such extension, including meter, does not exceed the average amount now invested by utility per consumer in the secondary distribution system.

"That where such prospective consumer desires such an extension for the development of territory for speculative purposes and for placing improved property on the market, such consumer shall deposit with the utility at the time of executing the contract the estimated amount to make such extension, any excess in the estimate over the amount actually required to make the extension to be returned to the consumer upon completion of the work.

"That where a commercial consumer desires service, such consumer shall deposit with the utility at the time of executing the contract the estimated amount to make such extension, any excess in the estimate over the amount actually required to make the extension to be returned to the consumer upon completion of the work.

"The commission finds that the amount determined by the utility as its present average investment, per consumer, in secondary distribution mains of ninety-four dollars and thirty cents ($94.30), is reasonable as a basis for determining what portion of future extensions shall be installed and furnished by utility without cost to the prospective consumer.

"It now appears to this commission, that, to allow competitive bids on gas extensions to retail consumers would be impractical and might give rise to injustices both upon the public and the utility."

The commission then gives details of installation costs and continues:

"The unit costs used are prices current today, base price of Class "B" cast iron pipe, $42.50 per ton f. o. b. Birmingham, Ala."

Gas Is Used in Electrified House

At Wilmette a completely electrified house is about completed in which extensive use is to be made of gas also. The fuel will be burned in a gas boiler for heating purpose. The laundry, provided with an electric washing machine and ironing machine, includes a drying room heated by gas. There are gas grates and model water heaters and likewise a refrigerator, all run by gas.

The place has attracted a good deal of attention in the extensive acquaintance of the owner who was formerly a member of the Public Service organization. Several other similarly fitted up houses are planned.

In various sections served by the company a number of electrified houses are under way or are planned. In several of these the use of gas for broad domestic purposes is intended.

Editor Discusses Gas Situation

Everett Purcell, well-known Oklahoma editor, writes relative to the gas situation in his newspaper, *The Enid Events*:

"Just a word or two on the agitation for a lower gas rate. *The Events* is strong for a lower gas rate. We would like to have gas furnished our people at a rate of ten cents per thousand feet. If we knew any way to procure ten-cent or twenty-five-cent gas we would do so instantly—on the spot—without a moment's hesitation. Our interests are identical with those of every gas user in this community. It costs us $33.90 to use gas at the Purcell residence for the month of January. We would like to have procured it for $10 or $15. And so—we repeat—if we knew any way to procure cheaper gas for Enid we would hop to it and get the cheaper gas. Unfortunately, we don't know how to procure cheaper gas.

"On the contrary, exhaustive investigations prove to us that we are very fortunate in being able to have natural gas at 63 cents. One of these days we will be glad to procure it at $1.00. The plain and indisputable facts are that our natural gas supply is playing out. We are lucky to have any at all. The supply available for Enid may last through this and next winter—and it may not. The gas situation is fast resolving itself into having only a sufficient supply for domestic purposes. Sad and sorry to relate, our people will presently be required to turn to coal and wood for heating purposes or electricity. Electric heaters are in the offing, and the big central power plant of the Oklahoma Gas & Electric Company of Enid will no doubt be furnishing a good part of our heat and fuel before many years, but that is another story, and it will be an interesting story when it is told.

"Undoubtedly our people would rather pay 63 cents per thousand for natural gas than $1.50 per thousand for manufactured gas.

"And that's the whole situation in a nutshell.

"Might as well face the facts. No use to kid ourselves along. Worse than useless to follow the lead of paid agitators who are out to wreck something for ulterior purposes of their own.

"To use an old simile: Why burn down the edifice to roast the meat?"

Coal Mining in Colorado

When the miners of Colorado produced 920,499 tons of coal during the month of October, they brought the total production of the state for the first ten months of the year up to 7,837,989 tons, an increase of 189,312 tons over the corresponding period of 1921.

The average number of men employed was 12,859 and the number of days worked per mine to date this year was 142.4.

The following table will show the counties of the state producing coal and the amount:

COUNTIES.	No. Men Employed Oct. '22	October Tonnage.	Total Tonnage to Oct. 31
Boulder	1,174	58,376	571,068
Delta	132	12,651	82,191
Elbert	23	606	1,528
El Paso	325	32,343	296,899
Fremont	1,204	59,810	321,929
Garfield	27	1,821	14,982
Gunnison	630	36,319	354,319
Huerfano	2,947	175,121	1,659,819
Jackson	78	7,778	47,703
Jefferson	211	18,324	141,759
La Plata	162	9,393	67,372
Las Animas	5,069	290,059	2,736,321
Mesa	344	18,206	115,337
Moffat	22	822	2,442
Montezuma	16	457	3,373
Montrose	...	.....	892
Pitkin	3	386	1,836
Routt	985	58,647	301,629
Rio Blanco	3	169	2,515
Weld	1,700	139,121	1,115,875
Total	15,055	920,499	7,837,989

Activities of The Western Oil and Gas Company

The Western Oil and Gas Company has contracted with the Allegheny Oil Company of Bartlesville, Oklahoma, to drill their Osage lease, the Allegheny company then sending a man to Pawhuska to obtain permission from the Indian agent. This well will be free to the Western Oil and Gas. The company is also negotiating with another Oklahoma firm to drill its free Okmulgee lease on a 50-50 basis. The company is preparing to install compressors on its gas lease in Labette County, which is considered one of the greatest gas fields in Kansas, owing to the fact that the Kansas-Oklahoma Gas Company will take all the gas that can be produced at $150 a million feet.

World's Production of Petroleum

According to the United States Geological Survey, the world's production of petroleum in the sixty-five years, 1857-1921, inclusive, aggregated 9,511,997,000 barrels of forty-two gallons each. The United States, the largest producer in the world, supplied 5,902,051,000 barrels, or 62.1 per cent of the total. Russia, second largest producer, supplied 1,993,171,000 barrels, or 20.3 per cent. Mexico was third with 7.7 per cent.

Housewives Hear Talk on Natural Gas Conservation

Dallas, Texas.—"Natural gas service is not universal, and Dallas is now enjoying what New York, Chicago and many other cities do not have," declared Ed. C. Connor, publicity man for the Lone Star Gas Company, in an address before the Housewives' League at a luncheon. "Natural gas, the heating value of which is twice that of artificial gas, is now being retailed in Dallas at one-half the price of artificial gas, and as the supply of natural gas is indefinite and variable, depending entirely upon the output of the wells from various gas fields, it behooves every housewife to be as conservative in the use of gas as possible," Mr. Connor stated. "Shreveport, La., has such a cheap gas rate that seven times as much gas is used for other purposes as is used for domestic purposes, and on account of its cheapness it costs the company less to let a leak in a pipe remain than it would to repair the pipe. The result is that it will be only a matter of a short time until the natural gas supply of Shreveport will be exhausted and the citizens will be forced to use the expensive artificial gas, thereby paying for the present waste."

Shelby, Mont., to Have Natural Gas

Shelby, Mont., will be provided with natural gas for heating and cooking and electric power for lighting by Jan. 1, 1923, according to the plans of the William A. Baehr organization, which holds the franchises for both services to the city. The equipment for the installation is now in transit, according to S. D. Fletcher, manager of the Great Falls Gas Company, who will be in charge of operations. The gas company is also looking forward to the possibility of natural gas for Great Falls within the next year, if developments in the field warrant piping it.

The Ohio company is already beginning the construction of the gas line from the Ohio-Berg well northeast of Shelby to the city limits of Shelby, and so carefully is the organization looking into the future that it has its plans already laid for the pipe line to Great Falls when gas production warrants it, Fletcher said.

The plans that had been made by the gas company after the visit of William Baehr last summer were for a 10-inch line, when the gas became available, with four pressure stations. The plans of the Ohio are for a 16-inch pipe with two large pressure stations. The cost is estimated at $2,500,000 initial expenditure. The Ohio would pipe it to the city limits, a distance of 104 miles.

The needs of Great Falls in natural gas is estimated by the gas company at 5,000,000 feet a day for the smelter and industries such as the brick plant and others, and 5,000,000 feet a day for the city for cooking and heating. The natural gas has twice the heating qualities of the manufactured gas. The gas will be delivered at a rate that will make it cheaper as a fuel for heating than coal with the additional advantages of ease of operation and automatic control of heat, Fletcher said. The 16-inch line will be ample not only for the 10,000,000 feet estimated needs of the city at this time, but for the natural increase of demand with the growth of the city and its industries. The city now uses about 300,000 feet a day.

While the price has not yet been definitely set for Shelby consumers, Fletcher said that it will be necessary for the price to take into consideration such matters as the life of the pipe line, the cost and life of each well, the profit on investment and distribution. Placing a price in the neighborhood of 35 cents per thousand feet, the gas could be used as cheaply for fuel as coal at a price of $3.50 a ton, while the town is now paying from $8 to $10 a ton for the cheaper grades of coal.

The gas company will spend from $75,000 to $100,000 in installation of equipment in Shelby, Fletcher said. Of this sum, the electric light plant will cost about $50,000 and the remainder will be on gas equipment. The laying of the gas mains will be started immediately and will proceed despite weather conditions. About two miles of main will be laid, six-inch pipe being used.

This will be sufficient to supply the houses and business buildings along the Main street of the town. The company had hoped to be able to enter into the piping and appliance business in Shelby, but will be unable to do this at this time due to the great amount of construction work that will occupy the chief attention of the organization.

Wisconsin Commission Orders Accounting System Change

Beginning with 1923, the entire bookkeeping system of all gas and electric companies in Wisconsin will be changed by order of the Railroad Commission.

All companies will have to keep their accounts in a uniform manner and in accordance with definite procedures laid down by the commission.

The new uniform classification of accounts ordered installed in Wisconsin is in conformity with the accounting plan adopted by the National Association of Utility Commissioners.

"It is the hope of commissions all over the nation to establish uniform accounting methods in all states through adoption of the national association's plan," said George C. Mathews, chief statistician of the Wisconsin commission, in his final conference with accountants of the different companies in Wisconsin.

"While public utilities will have to incur considerable expense in introducing the new system," he continued, "by way of buying new financial and operating reports and various new books and records, the results will generally benefit the public.

"I recognize also that the larger utilities will have the biggest problem on their hands in re-educating their foremen and other employees to make charges in the way, but once the new systems mastered, most of the newly created accounting troubles will be over.

"With the new system in force, utility commissions will be able to make better comparisons between operating costs of not only the companies in Wisconsin, but in other states as well.

"This will tend to make utilities strive harder for operating economies and the result will be that the public will be given the benefits of the increased efficiency created."

Refuses Offer for Plant

St. John, N. B.—The New Brunswick Power Company, controlling the electric light and power, street car and gas services here, has rejected the municipal offer of $2,577,655 for its plant and equipment, Mayor Fisher announced. This figure was set by the Supreme Court as the value of the company's property in 1920.

The power company offered four alternative propositions: To sell the property to the city on a basis to be determined by arbitration; to arbitrate the rates to be charged; to elect two members of the Board of Directors of the company on appointment by the city; or to sell the electric light and power department to the city, retaining the street railway and gas departments.

The company's bonds are held largely in the United States.

May Secure Gas for Bradentown

Bradentown, Fla.—There is a possibility that this city may get a gas plant at some not far distant date. C. N. Turner, proprietor of the Braden Hotel, brought up the matter of a gas plant for Bradentown, in a recent meeting of the board of trade.

"A gas plant is the thing we need most," said Mr. Turner. "It would be a great convenience. On my recent visit to Chicago I took up the matter of a gas plant for this city with a banker friend of mine, who promised me he would endeavor to interest capital there in the proposition. I would like to know if there is any franchise already given that would stand in the way of any company that might want to put in a gas plant here."

Elk City to Vote on Gas Franchise

Elk City, Okla.—The Domestic Service Corporation of Denver and Fort Worth has been awarded the franchise for twenty-one years with the option of four years more, with the provision that Elk City may buy as a municipal plant at any time.

The passing of the ordinance granting this franchise must be ratified and accepted by a majority vote of the legal voters at an election to be held December 26. The service company is to pay all expenses of the election and advertising.

The service company's engineers have made complete plants of the city for a Belt System gas plant. This system has proven the best. A complete gas main is laid around the entire city, laterals laid through the streets and alleys, making frequent connections to the main, thereby making the gas pressure even throughout the system.

This service company contemplates an eight-inch pipe line to the Sayre gas field from Elk City, providing they secure a franchise at Clinton, which they are now working for. If they do not get through to Clinton, a six-inch pipe-line will be laid. The company claims there is sufficient gas in the one big gas well at Sayre to serve all the cities of West Oklahoma. Nine hundred thousand cubic feet of gas would be all Elk City could ever expect to use, and the six-inch pipe would have a capacity of three million.

Gas Companies Cannot Abandon Jamestown Service

Jamestown, N. Y.—The Pennsylvania Gas Company and the National Fuel Gas Company cannot abandon their service in Jamestown at the present time, was the decision of Special Master Almond W. Lytle, Buffalo, in the action whereby the city sought to make permanent a temporary injunction restraining the companies from withdrawing their service.

The decision holds that the company acted in good faith in seeking to withdraw service because of a vanishing supply and simply continues the temporary injunction. The decision offers no hope that an additional supply may be received in the future.

The action was started about three years ago and has been in practically every court in the state in one way or another.

Mixed Gas Rates Are Ratified

Louisville, Ky.—Mayor Huston Quin, for the City of Louisville, and Halford Erickson, vice-president, and Judge Arthur Peter, attorney, for the Louisville Gas & Electric Company, on Nov. 29 signed the contract, provided for in an ordinance, whereby the company, beginning Dec. 1 and ending March 1, may charge increased rates for a mixture of natural and artificial gas.

The franchise rates and the mixed-gas rates compare as follows:

	Franchise rate.	Mixed gas rate.
First 2,000 cu. ft....	$0.60	$0.60
Next 3,000 cu. ft....	.35	.35
Next 5,000 cu. ft....	.35	.40
Next 10,000 cu. ft...	.35	.45
All over 20,000 cu. ft.	.35	.60

Concession for Gas Line

Amarillo, Texas.—A right of way over the Canadian River north of Amarillo has been granted by the Commissioners of Potter County to the Amarillo Oil Company for the laying of an *8-inch gas main*. Use of the bridge over the river is granted in the concession. The company's application for the franchise stated that the line is to be laid to transport gas for industrial purposes, and this has led to rumors that the American Smelting & Refining Co. considers the erection of a smelter here. Officials of the company recently were in conference here with officials of the oil company.

Lee Bivins and associates have purchased a tract of the Greater Amarillo Oil Company's leases in Section 20, Block 3, of the G. & M. Survey, and have contracted to complete to 3,000 feet a well started in that direction by the oil company. The well was drilled to 2,590 feet, at which depth a gas sand was mudded off that was reported to have a capacity of 150,000,000 cubic feet of gas.

New Installation Will Reduce Rates

Hibbing, Minn.—The Water & Light Board has decided on an extension of the gas service to various sections of the city. Bids for a water gas set which will be opened Dec. 12 has been authorized. When installed, gas extensions will be available to Brooklyn and to other portions of the city. The improvement will necessitate another small building at the present gas plant, it is asserted. The installation of the gas set means that three men will do the work of nine men now employed at the plant, officials say.

The new addition will take care of residents of the eastern addition and residents in both North and South Hibbing. When the new set is installed, coke from the old benches at the gas plant will be used. The cost of gas will be reduced for consumers in the city as the cost of manufacturing it will be cheaper, the officials point out.

Had Venison Dinner

Albert Lea, Minn.—About seventy employees of the Southern Minnesota Gas & Electric Co. representing the plants at Blooming Prairie, Owatonna, Blue Earth, Lake Mills, Elmore, St. Charles and Albert Lea enjoyed a venison dinner in Albert Lea recently.

J. J. Shannon, superintendent of construction of the company, shot a fine deer and he wanted to prove to all that he is some hunter.

Oscar Stauch of the Elks Club prepared the venison and other food. The menu was served as follows:

Roast Venison Baked Sweet Potatoes
Mashed Potatoes and Brown Gravy
Cranberry Sherbet Celery Olives
Pumpkin Pie Coffee
Cigars and Cigarettes

After the banquet a number of speeches were made which were followed by a few hours of dancing.

Gas for Street Lighting

The following places installed additional Welsbach Gas Street Lamps during the month of October: East Orange, N. J.; South Orange, N. J.; Lowell, Mass.; St. Louis, Mo.; Mt. Vernon, N. Y.; Silver Lake Park, N. Y.; Augurville, Conn.; Camden, N. J.; Palmyra, N. J.; Boston, Mass.; Brookfield, Ill.; Gloucester Township, N. J.

The following places renewed their Welsbach Gas Street Lighting contracts as follows:

New Bedford, Mass., 1 year; Brookfield, Ill., 10 years; Arlington Hgts., Ill., 5 years; Haverhill, Mass., 5 years; Mt. Oliver, Pa.

Adjourn Stockholders' Meeting

The special meeting of the stockholders of the Brooklyn Union Gas Company to approve an extension of the charter so as to permit the company to operate in Queens as well as Kings County, N. Y., was adjourned to March 29, 1923.

Gas Plant for Spencer, Iowa

Spencer, Iowa.—R. S. Redman, gas plant expert and engineer of American Gas and Construction Company, was in Spencer recently going over the situation and proposal to install a gas plant in Spencer. He conferred with city officials and gave as his opinion that a gas plant in connection with the city electric power plant was not only feasible but the thing to do in Spencer. P. J. Cilley, city councilman and chairman of the committee looking into the project for the board of directors of the Spencer Commercial Club, went over the situation with Mr. Redman. Otto A. Bjornstad and E. S. Randall of the committee also went into the proposition.

Steam from the electric power plant can be used by the gas plant, Mr. Redman stated, and this will effect a considerable saving. A plant should be built that will care for the needs of a city of 10,000, Mr. Cilley stated, and preliminary figures showed that this will cost around $75,000. Further investigations will be made before any move will be decided upon and two plans are in mind to finance the project. One is that bonds be voted at a special election and the other that gas certificates be sold somewhat along the lines formerly followed when new water mains were put in. Spencer is decidedly in need of a gas plant and its convenience and saving to its customers can be realized by those who have used gas elsewhere.

Not a Fat Man

Mansfield, O.—"Some politicians who have no more principle than an oyster has elbows have posed as saviors of the people and have gained supporters by creating an image of Mr. Public Utility as a fat man with a fat tummy, a fat head and a fat purse," says Edward F. Wickwire, secretary of the Ohio Brass Co., Mansfield, Ohio, in a recent address.

"Whereas," continues Mr. Wickwire, "so far as profits for the past few years are concerned, 'Mr. Public Utility' has been thin enough to act as advance agent for a famine. He is just now beginning to get to normal, healthy weight.

"It was shrewd work on the part of the unscrupulous politicians, and it brought them a lot of applause from surface-thinking citizens when they threw mud at the silk hat of their own effigy, squeezed his bulky-looking pocketbook and trod on his patent leather toes.

"But now 'Mr. Public Utility' is before the public in his true garb. He is wearing overalls. Two million factory workers making materials for the public utility industry, are awakening to the fact that if his overalls have patches on, theirs will also—that if there is no jingle of coin in his pockets, theirs will be empty—that if his dinner pail is bare they must also go hungry.

"The crafty politicians and the unthinking public have not taken this army of laboring men into their calculations until recently in connection with their treatment of the electric railway, the lighting company, the gas company and other utilities.

"But this legion of workers is now alive to the fact that a square deal for the utilities means a square meal for them and they are peeling off their coats and preparing to put up a strong fight in behalf of the industry upon which they are dependent for a livelihood.

"Public utilities buy the products of a great many manufacturers throughout the country and it therefore follows that the prosperity of those manufacturers is closely linked with the welfare of the utilities. These manufacturers have gotten together and are organizing their army of employees to come to the rescue of the utilities, which have been subjected to regulation and intimidation, until in many cases it almost amounts to strangulation.

"The radical element has been able to take advantage of the situation because a large percentage of unthinking people have not realized the fact that their own welfare is connected with the fortunes of the utilities, but they are rapidly being awakened to that fact. Take electric lights, electric power, street car service, gas service and the telephone out of a city, and what would happen to the citizens? Yet if the income of utilities is limited by legislative enactment while the outgo runs riot, public service development must cease and even begin to go back."

Mr. Wickwire says the real point for the individual to consider is whether it is to his interest to pay a rate which will enable the utilities to render good service or whether he would be better off if he had to furnish his own electricity, his own gas and his own transportation.

Study of Explosions of Gaseous Mixtures

An investigation of explosions of gaseous mixtures at constant volume was undertaken by the Engineering Experiment Station in 1914 when C. R. Richards, at that time head of the Department of Mechanical Engineering, outlined an extensive series of experiments and defined the scope of the investigation. Apparatus was designed, and a few results showing the effect of the shape of the explosion vessel, and of turbulence at the time of firing were obtained, when it was necessary to discontinue the work. In 1919 the apparatus was partly re-designed and work was resumed. This bulletin is a preliminary report of the methods pursued and the results thus far obtained.

The immediate object of the series of tests reported in this bulletin was a study of the physical phenomena involved in the explosions of various mixtures of illuminating gas and air. This includes the determination of the effect of differently shaped explosion vessels, and of turbulence at the time of ignition as well as a study of the heat loss from the burning mass of gas.

The bulletin also contains an historical review of the principal researches made in the study of explosions of gaseous mixtures, and a valuable bibliography on the subject.

Copies of Bulletin No. 133 may be obtained without charge by addressing the Engineering Experiment Station, Urbana, Illinois.

Gas Co. Officials at Banquet

Titusville, Pa.—Thirty-five agents and employees of the United Natural Gas Co. in the Titusville and Meadville districts and officials of the company were present at a banquet held recently when various problems of the industry were discussed and plans for a better understanding with the public outlined.

Those officials of the company present included: Raymond Cross, president; C. F. Huff, general superintendent; T. R. Weymoputh, chief engineer; H. S. Rose, assistant treasurer; P. L. Mulkin, assistant superintendent; R. P. Anderson, chief chemist, all of Oil City; J. M. Bridges, manager of the Franklin agency; F. A. Fairchild, Meadville agency, and Clifford Jennings, Titusville agent.